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Authorized Distributor

Cat. No. P072-E4-02
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Sysmac Catalogue

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Sysmac Catalogue

One Machine Control

sysmac
always in control

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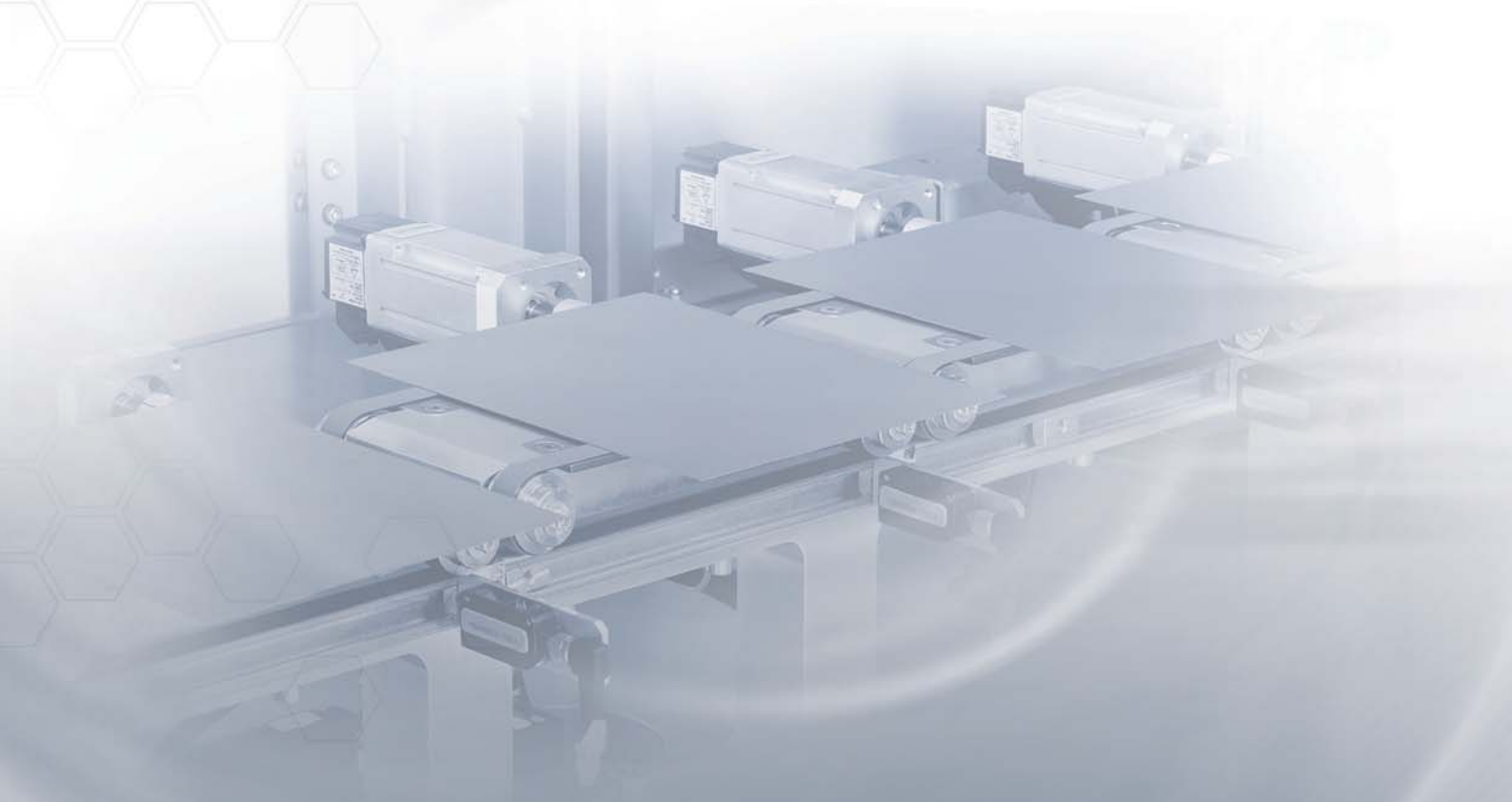

The product photographs and figures that are used in this catalog may vary somewhat from the actual products.

Sysmac Catalogue

This document is a selection and design guide helping you to create fast, flexible and reliable machines. Sysmac Automation Platform provides an integrated solution consisting of the best in class machine controller working seamlessly with the best in class field devices across the fastest machine network in the market - EtherCAT. Sysmac Automation Platform is programmed, configured and simulated by one software - Sysmac Studio, and accessed through one connection, EtherNet/IP.

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Main content

One Machine Control

Motion, Logic and Vision in one

Complete machine control through one connection and one software is how we define the new Sysmac machine control. Our new machine automation controller - NJ - that integrates motion, sequencing and network, a new software - Sysmac Studio - that includes configuration, programming, simulation and monitoring plus a fast machine network -EtherCAT - to control motion, vision, sensors and actuators, Sysmac is a powerful and robust ONE automation platform.

One machine controller: NJ-Series

For complete control and management of your machine.
Logic and advanced motion control in one

One factory automation network : EtherNet/IP

For local or remote access to the complete machine

One machine network: EtherCAT

For real time control of servo drive, inverter, vision system and I/O

One software: Sysmac Studio

For configuration, programming, simulation and monitoring

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EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

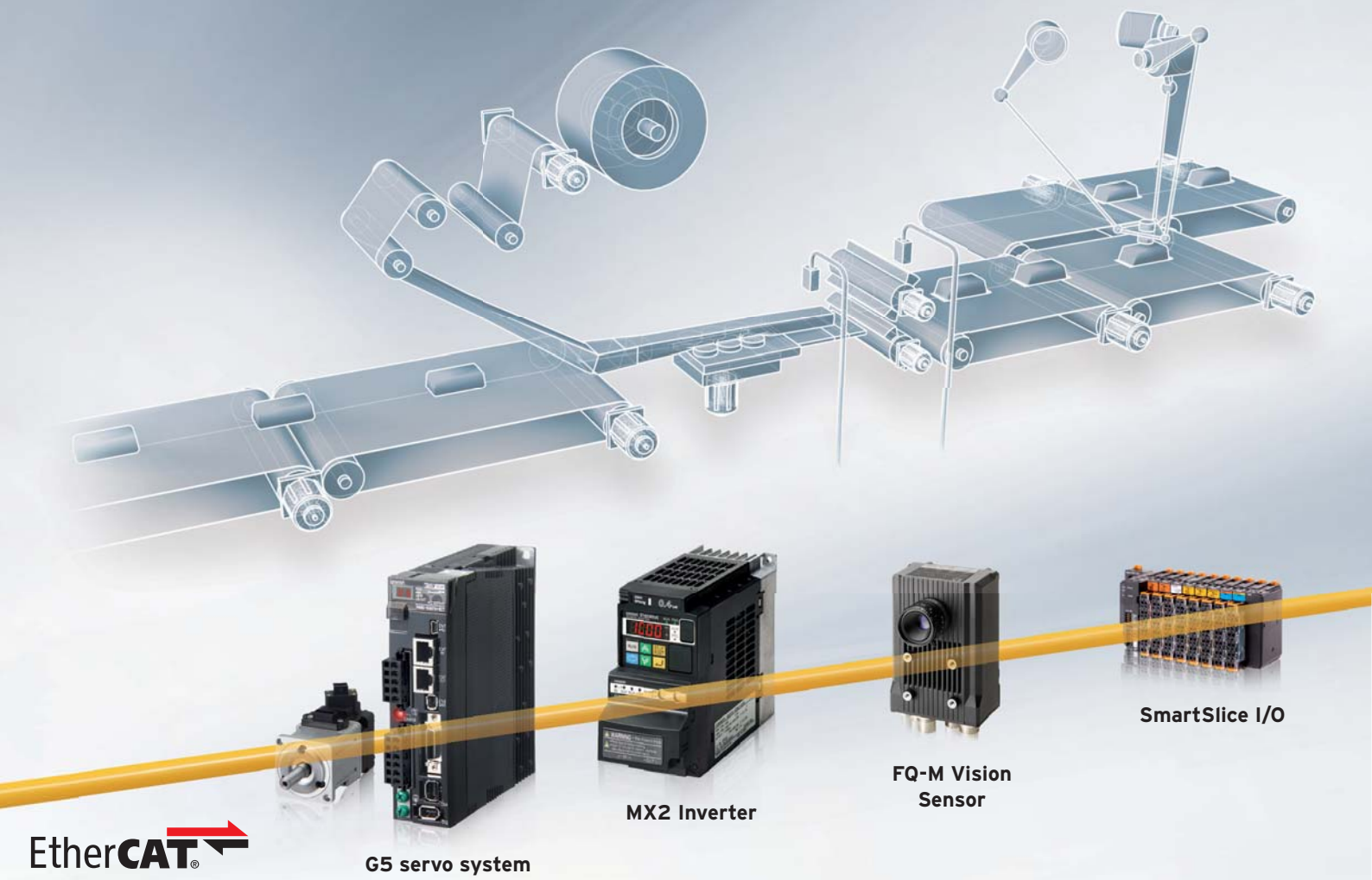
One connection
One machine network

One connection via the NJ-Series controller allows seamless control and communication with both the machine and the factory. The new NJ-Series controllers join the world standard factory automation network, EtherNet/IP, with the best Ethernet-based machine control network, EtherCAT.

EtherNet/IP: the ONE factory automation network

- Peer-to-Peer controller communication
- Interface with NS HMI series or SCADA software
- Interface to Sysmac Studio

IMAGE



EtherCAT: the ONE machine network

- Up to 192 slaves
- Fastest machine network on the market
- Noise immunity to stringent Omron standards
- Embedded in Omron servo drive, inverter, vision sensor and I/O
- Uses standard STP Ethernet cable with RJ45 connectors

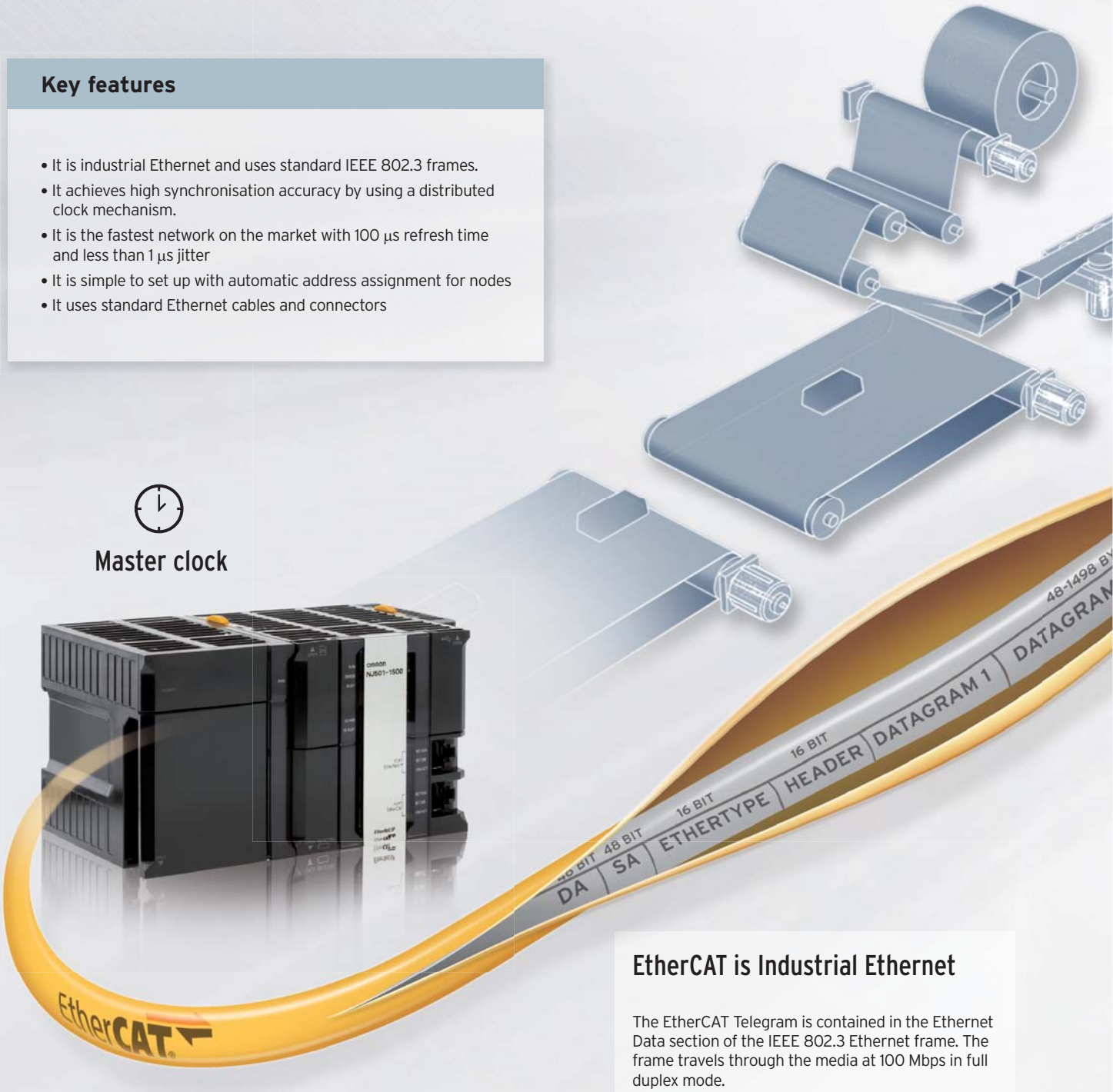
One connection

EtherCAT the optimal machine network

EtherCAT is the fastest emerging network for machine automation. It is Omron's de-facto machine network for our wide range of field and motion devices. It is Ethernet based, fast, accurate and highly efficient in terms of data transmission. All our EtherCAT devices have been designed and tested to meet Omron's stringent requirements on noise immunity.

Key features

- It is industrial Ethernet and uses standard IEEE 802.3 frames.
- It achieves high synchronisation accuracy by using a distributed clock mechanism.
- It is the fastest network on the market with 100 μs refresh time and less than 1 μs jitter
- It is simple to set up with automatic address assignment for nodes
- It uses standard Ethernet cables and connectors

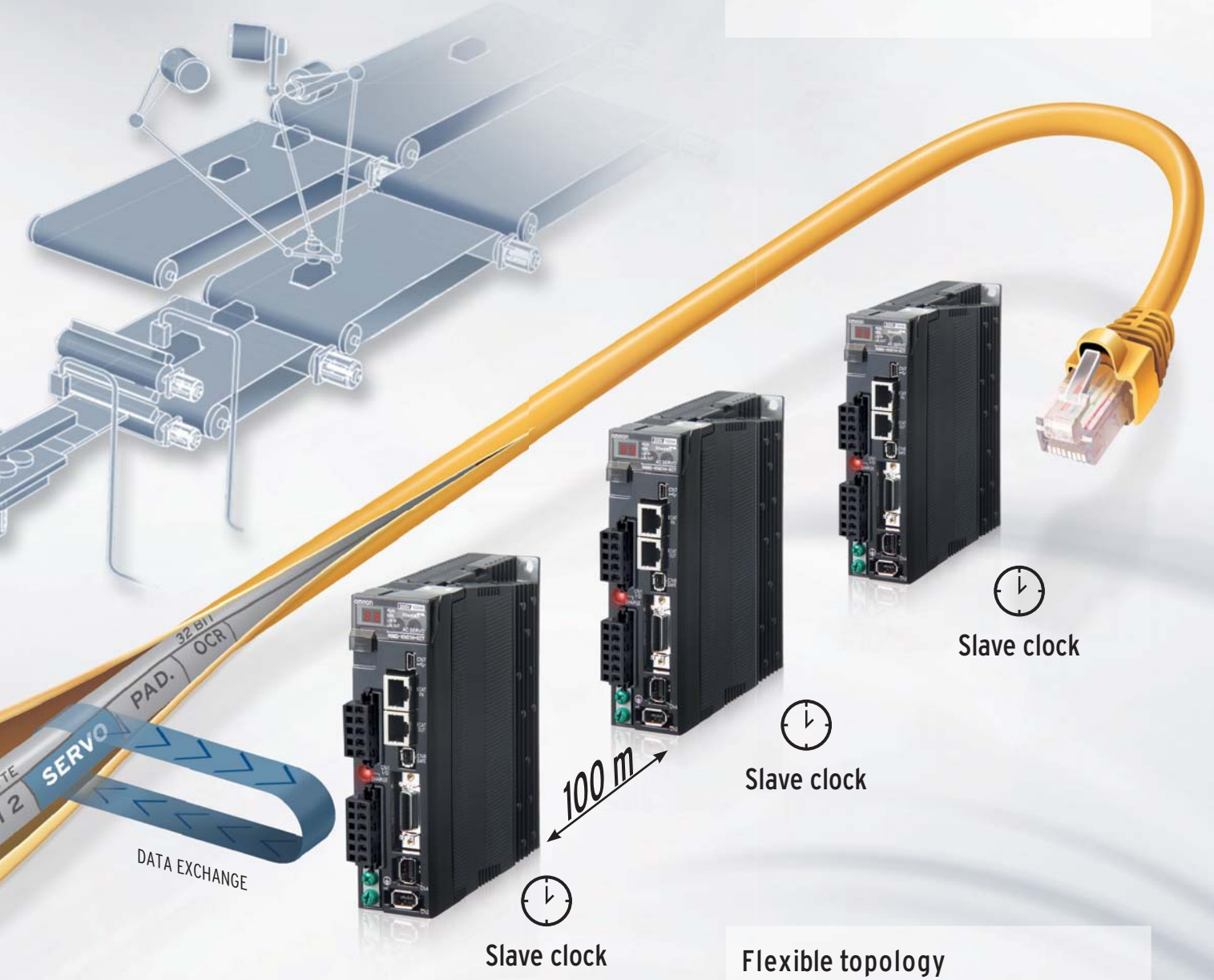


EtherCAT is Industrial Ethernet

The EtherCAT Telegram is contained in the Ethernet Data section of the IEEE 802.3 Ethernet frame. The frame travels through the media at 100 Mbps in full duplex mode.

Simple cabling: 100Base-TX

EtherCAT uses standard 100BASE-TX Ethernet communication very efficiently, over standard shielded Ethernet cables and connectors. No need for network switches.



Flexible topology

With two EtherCAT ports on all devices, no additional switches are required to create a linear network. EtherCAT junctions can be used to build tree and star topologies, which can reduce the amount of cabling.

"On-the-fly" data exchange

The slave devices extract and/or insert data on the fly. This method assures the highest possible throughput.

Distributed clocks

The EtherCAT node slave measures the time difference between incoming and returning frame - timestamp-. With these timestamps the master can determine the propagation delay offset to the individual slave accurately. This mechanism ensures accurate synchronisation between devices within less than 1 µs jitter.

One software

Sysmac Studio for machine creators

Turning machine programmers into machine creators is the driving vision behind Sysmac Studio. Cutting programming, debugging and set-up time while maximising the functionality and performance of your machine is our ultimate goal. For this Sysmac Studio aims to offer ONE software for the complete machine. A software tool that only needs to be learned once, programmed, tested and tuned as one and secured as a whole.

Learn it ONCE
Develop it FAST
Test it in ONE
Secure it ALL

Learn it ONCE

- One software for motion, drives and vision
- Fully compliant with open standard IEC 61131-3
- One design and operation environment for configuration, programming and monitoring

Develop it FAST

- Supports Ladder, Structured Text and Function Block programming with a rich instruction set
- CAM editor for easy programming of complex motion profiles
- Intuitive editor with auto-complete assistance for Ladder and Structured Text programming

Test it in ONE

- One simulation tool for sequence and motion in a 3D environment
- Complete or partial program can be simulated and debugged
- Data trending for tuning and debugging

Secure it ALL

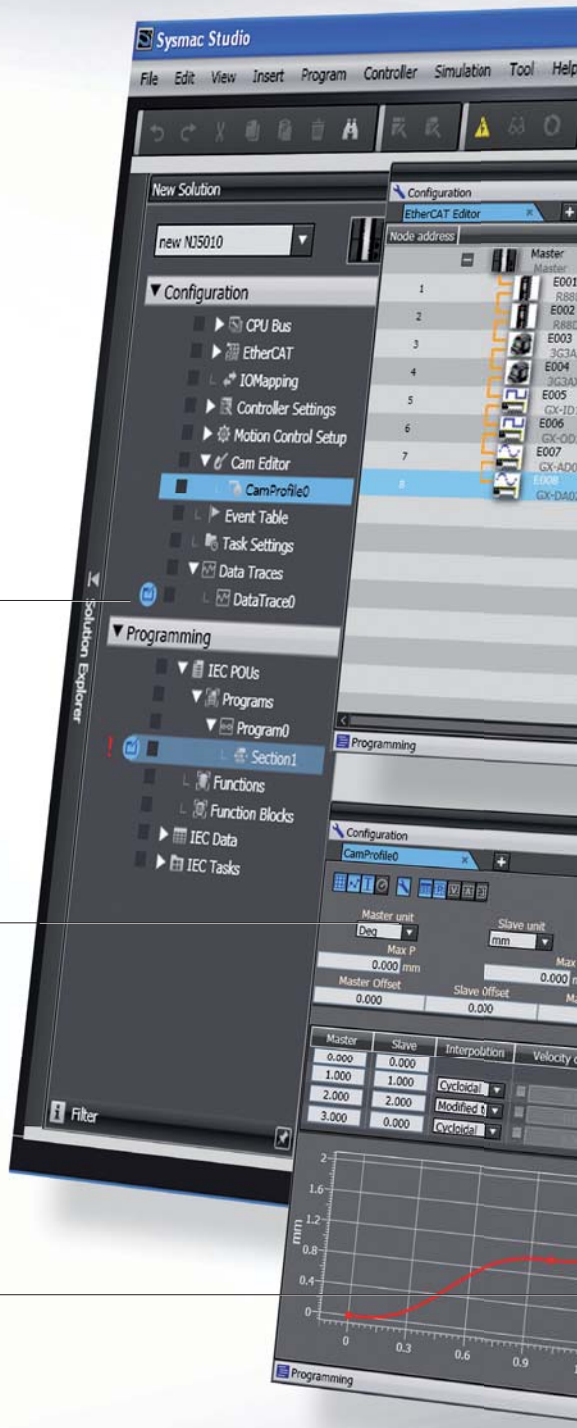
- Advanced security function with 32 digit security password.
- Complete project or single Function Block* can be protected
- Machine cloning prevention

* Available in Sysmac Studio above v1.0

One software

Sysmac Studio to develop machines

Created to give you complete control over your automation system, Sysmac Studio integrates configuration, programming and monitoring. Graphics-oriented configuration allows quick set-up of the controller, field devices and networks while machine and motion programming based on IEC standard and PLCopen Function Blocks for Motion Control cuts programming time. Smart Editor with On-line debugging helps quick and error free programming. Advanced simulation of sequence and motion control, data trace reduce machine tuning and set-up.



Design and operability

Unified design environment is provided for programming, configuration and monitoring. It also offers intuitive navigation between control modes.

Motion control

The graphical CAM editor allows quick implementation of complex motion profiles. CAM tables can be modified on the fly. A PLCopen Function Blocks for the Motion Control library are available to implement general purpose motion control.

Simulation

Motion trajectories in 3D can be pre-tested with advanced simulation of sequence and motion control. Simulation of single Function Blocks, POU's or the entire program can be performed. In addition all standard features such as Break & Step are available.

Data tracing

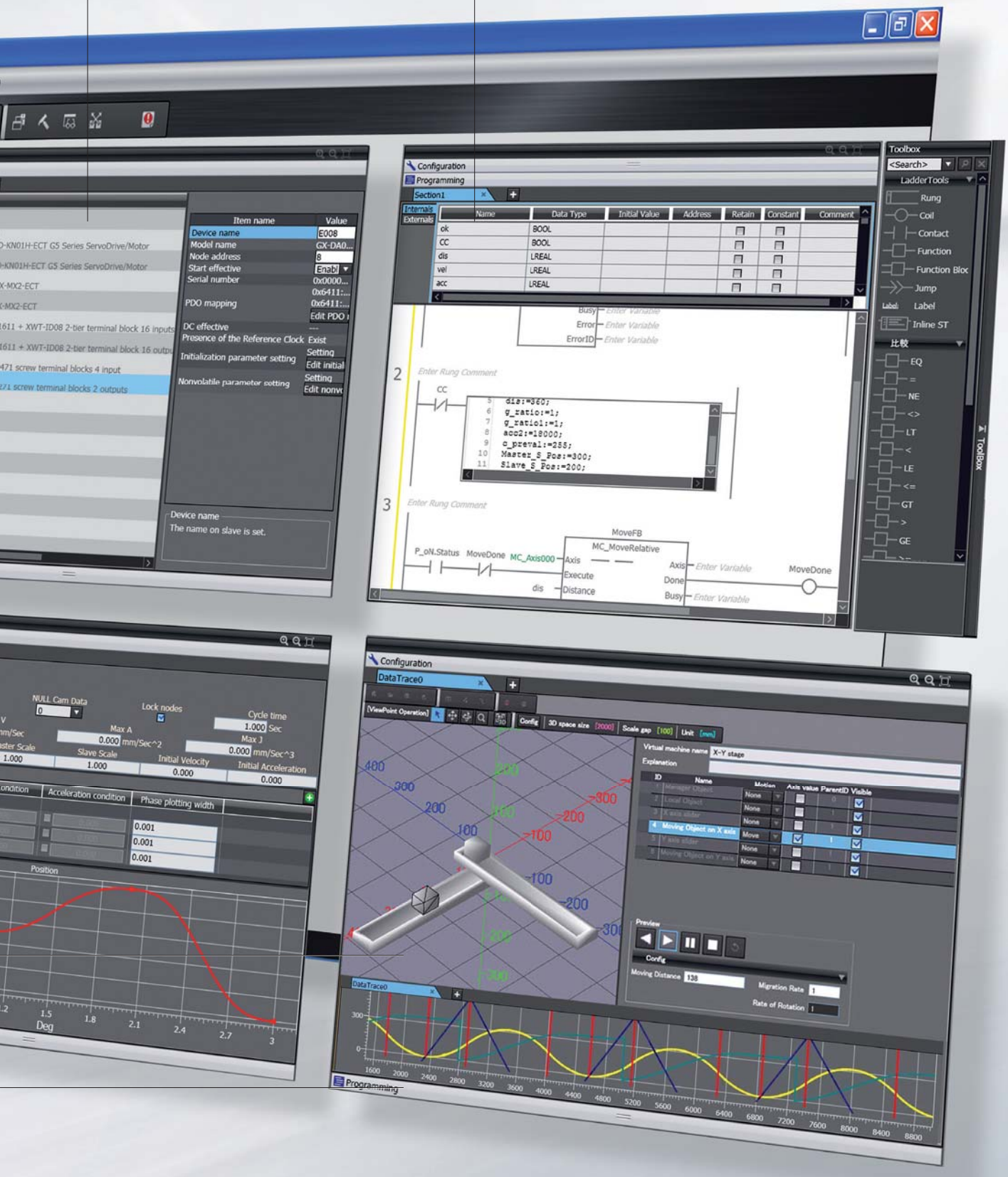
Easy system tuning thanks to integrated and synchronised data tracing of motion commands, position and speed feedback and I/O status and values.

Configuration

Simple drag & drop configuration for controller, network, servo-axis and other field devices.

Programming

Multi-tasking and fully compliant with IEC61131-3 standard. The program editor includes smart support functions such as syntax error check and clear colour segregation of variables and symbols. ST instructions can be directly written in Ladder programs thanks to in-line ST function.



NJ-Series Machine Automation Controller

Complete and robust machine automation

The NJ-Series Machine Automation Controller is at the heart of the new Sysmac platform. One integrated machine controller that offers speed, flexibility and scalability of software centric architecture without compromising on the traditional reliability and robustness that you have come to expect from Omron PLCs. The NJ-Series is designed to meet extreme machine control requirements in terms of motion control speed and accuracy, communication, security and robustness. You just create…

Hardware design

- Architecture Based on new Intel® Atom™ Processor
- The most compact controller in its class (According to July 2011)
- Built-in USB port and SD card slot
- Fan-less cooling

- Motion control
- Up to 64 axis control
- Single axis moves and axes interpolation
- Electronic cams and gearboxes

System robustness

- One event log for controller, field devices and networks
- Standard PLC system check: Watch-Dog Timer, memory check, network topology check, etc.

Machine control

- Seamless integration of Logic and Motion
- Synchronous control of all machine network devices
- Works with most CJ PLC series modules

NJ-Series controller features

- Motion controller supporting up to 64 servo axes
- EtherNet/IP and EtherCAT ports embedded
- Up to 192 EtherCAT Slaves (64 axes)
- Standard IEC 61131-3 programming
- Certified PLCopen Function Blocks for Motion Control
- Linear and circular interpolation
- Linear and infinite axes management
- Electronic Gear and CAM synchronisation
- Global standards CE, cULus, NK, LR

Standard Factory network

- Programming
- Other Machine controllers
- HMI / SCADA
- IT systems

Standard Machine network

- Servos
- Inverters
- Vision systems
- Distributed I/O

Standard programming

- Fully conforms IEC 61131-3 standards
- PLCopen Function Blocks for Motion Control

This product incorporates certain third party software.
The license and copyright information associated with this software is available at http://www.fa.omron.co.jp/nj_info_e/

G5 Servo system
At the heart of every great machine

Great machines are born from a perfect match between control and mechanics. G5 gives you that extra edge to build more accurate, faster, smaller and safer machines.

EtherCAT

EtherCAT connectivity

- Compliant with CoE -CiA402 Drive profile-
- Cyclic synchronous Position, Velocity and Torque modes
- Embedded Gear Ratio, Homing and Profile Position mode
- Distributed clock to ensure high precision synchronisation

G5 servo system features

- Compact size servo drives with EtherCAT connectivity built-in
- High-response frequency of 2 kHz
- Load vibration suppression
- Embedded Safety conforming ISO13849-1 Performance Level c,d
- Advanced tuning algorithms (Anti-vibration function, torque feedforward, disturbance observer)
- Wide range of linear and rotary servo motors

Safety conformance

- PLc,d according ISO13849-1
- STO: IEC61800-5-2
- SIL2 according to EN61508

Improved rotary motors

- Low cogging torque servo motors
- High accuracy provided by 20 bit encoder
- IP67 for all motors and connectors
- Large range of motors from 0.16 Nm up to 96 Nm nominal torque (224 Nm peak)

Ironless linear motors*

- Compact, efficient design
- Excellent force-to-weight ratio
- No latching force

Iron-core linear motors*

- Compact, flat design
- Optimum ratio between force and volume
- Weight-optimized magnetic track

* Available soon

MX2 Inverter

Born to drive machines

Thanks to its advanced design and algorithms, the MX2 provides smooth control down to zero speed, plus precise operation for cyclic operations and torque control capability in open loop. The MX2 is fully integrated within the Omron Sysmac automation platform.

Torque control in open loop

- Ideal for low to medium torque applications
- Can replace a flux vector inverter or servo drive in suitable systems

EtherCAT®

EtherCAT connectivity

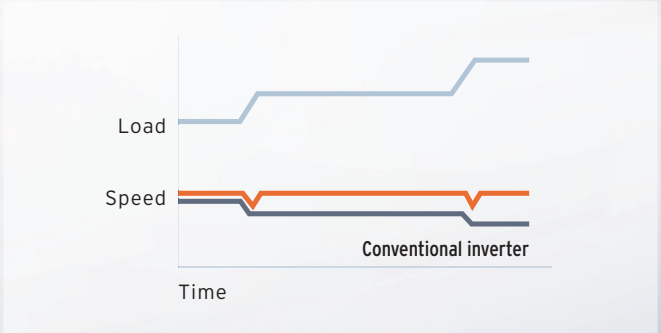
- Compliant with CoE -CiA402 Drive profile-
- Velocity mode

MX2 features

- Torque control in open loop, ideal for low to medium torque applications.
- 200% starting torque near stand-still operation (0.5Hz)
- Double rating VT 120%/1 min and CT 150%/1 min

Quick response to load fluctuation

- MX2 provides accurate speed control with less than 2% error at 1 Hz
- Stable control without decreasing machine speed improves quality and productivity

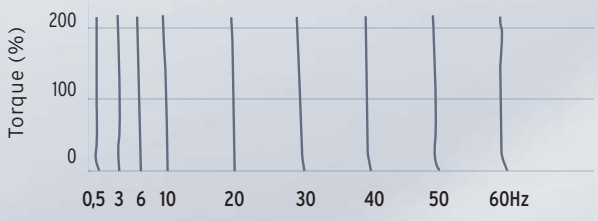


200% starting torque

- Near stand-still operation (0.5Hz)
- Smooth control of high inertia loads
- Control of fast cyclic loads

Frequency response vs Torque

(Example with 7.5kW 4-pole motor)



FQ-M Vision Sensor

Designed for object tracking

The new FQ-M series is a vision sensor designed specifically for Pick & Place applications. It comes with EtherCAT embedded and can be configured and monitored from Sysmac Studio software. The FQ-M series is compact, fast and includes an incremental encoder input for easy tracking and calibration.

EtherCAT®

Connectivity

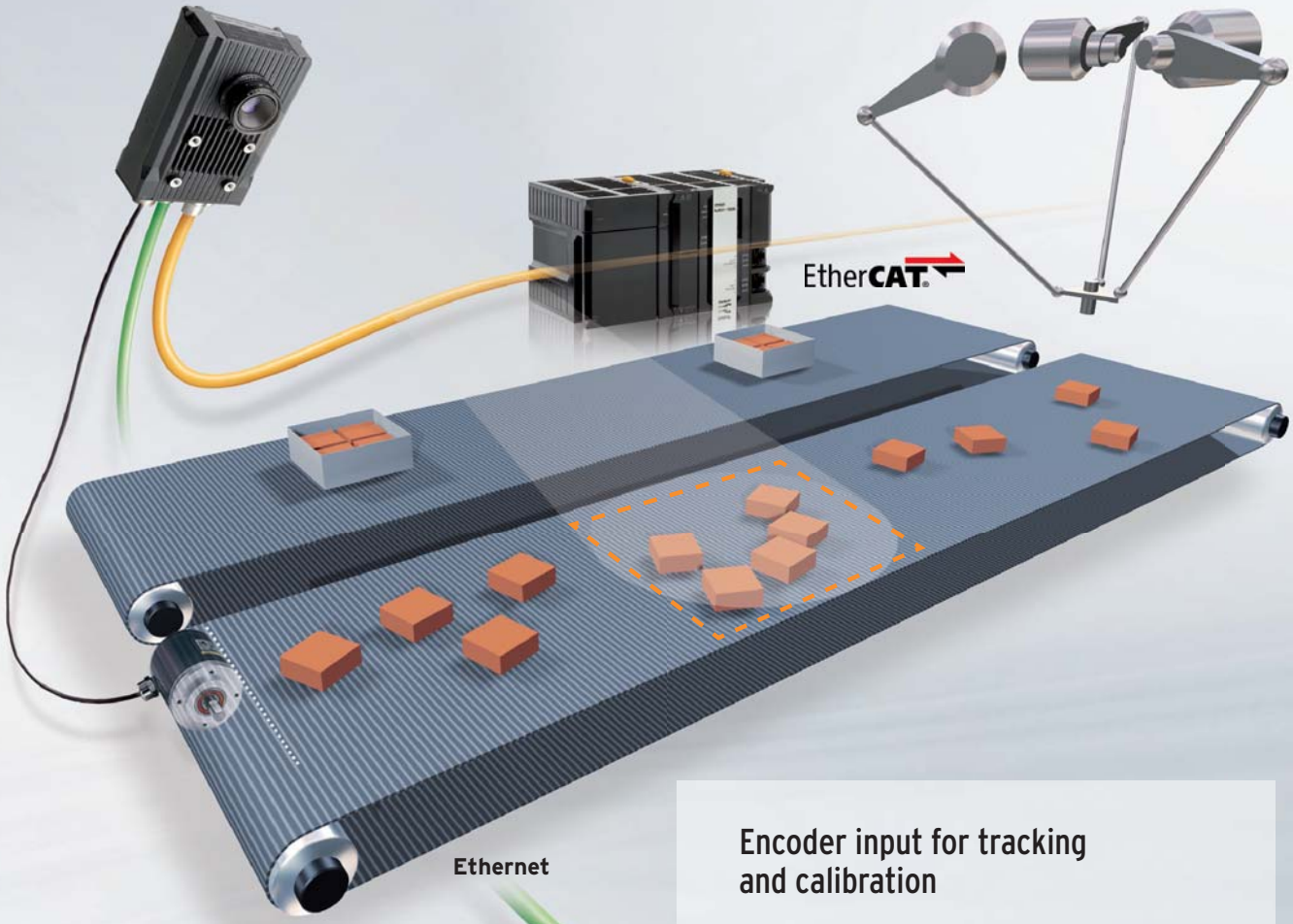
- EtherCAT port for object tracking
- Ethernet port for advanced configuration and monitoring
- Encoder input for accurate "on the fly tracking" and easy calibration
- Automatic strobe timing control

Detection

- Up to 5000 pieces per minute with 360 degree rotation
- Stable and robust detection under changeable environmental conditions

Key features

- Made specifically for tracking applications
- Designed to work within Sysmac integrated automation with embedded EtherCAT and integrated software tool
- Smart camera with EtherCAT: camera, image processing and connectivity in one
- Vision sensor with encoder input for tracking function
- Calibration function of the complete system
- Can inspect small and large objects
- Sysmac Studio software for vision system operation and setting



Design

- Camera and image processing in one
- Standard C-mount lenses; choose the field of view and focus distance you need
- Variety of industrial connector types (angled, straight) for correct mounting

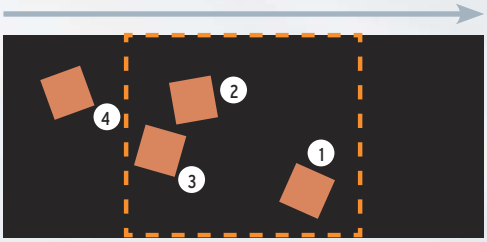
Software tool

- Fully integrated within the Sysmac Studio software tool
- Intuitive and icon driven set-up and configuration
- Trending and logging function

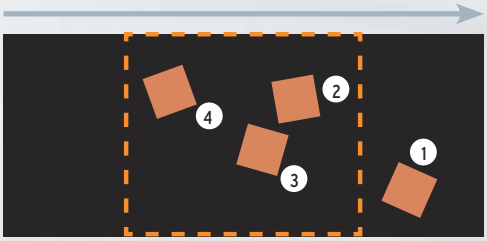
Encoder input for tracking and calibration

» The assisted calibration procedure simplifies the overall system set-up.

» Objects that overlap within more than one field of view are segregated and its data is ignored.



First shot: The position and orientation data of pieces 1, 2 and 3 are sent to the controller.



Next shot: Only the position and orientation data of piece 4 are sent to the controller.

Service and Support

PRESENCE

OMRON technical offices across the World

Tsunagi laboratory | Automation Competence Centre | Technical office | Premium partner

COMPETENCE

OMRON

Design

Our wide network of machine automation specialists will help you to select the right automation architecture and products to meet your requirements. Our flat structure based on expert-to-expert contact ensures that you will have ONE accountable and responsible expert to deal with on your complete project.

Proof of concept

As your project matures make use of our Automation centers to test and catch-up with technology trends in motion, robotics, networking, safety, quality control etc. Make use of our Tsunagi (connectivity) laboratory to interface, test and validate your complete system with our new machine network (EtherCAT) and factory network (EtherNet/IP).

We will assign a dedicated application engineer to assist with initial programming and proof testing of the critical aspects of your automation system. Our application engineers have in-depth expertise in and knowledge of networks, PLCs, motion, safety and HMIs when applied to machine automation.

CONFIDENCE ASSURANCE

Development

During your prototyping phase you will need flexibility in technical support, product supply and exchange. We will assign an inside sales contact to help you with you source the correct products fast during your prototyping phase.

Commissioning

With our world-wide network for service and support the export of your product is made simple, we will support you on-site with your customer, anywhere in the world. We can arrange a liaison sales engineer to facilitate training, spare parts supply or even machine commissioning. All this in a localised language with localised documentation – giving you complete peace of mind.

After Sales support

Our support does not end at pre-sale application engineering. Omron provides a comprehensive set of post-sales support services including:

- Commissioning/startup
- Field maintenance and troubleshooting
- Telephone technical support
- Replacement parts
- Training
- Product operation/automation optimization
- Warranty repair

System Design Guide

System Configuration

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Digital I/O Terminal 3-tier Terminal Block Type 108
Digital I/O Terminal e-CON Connector Type 112
Analog I/O Terminal 2-tier Terminal Block Type 120
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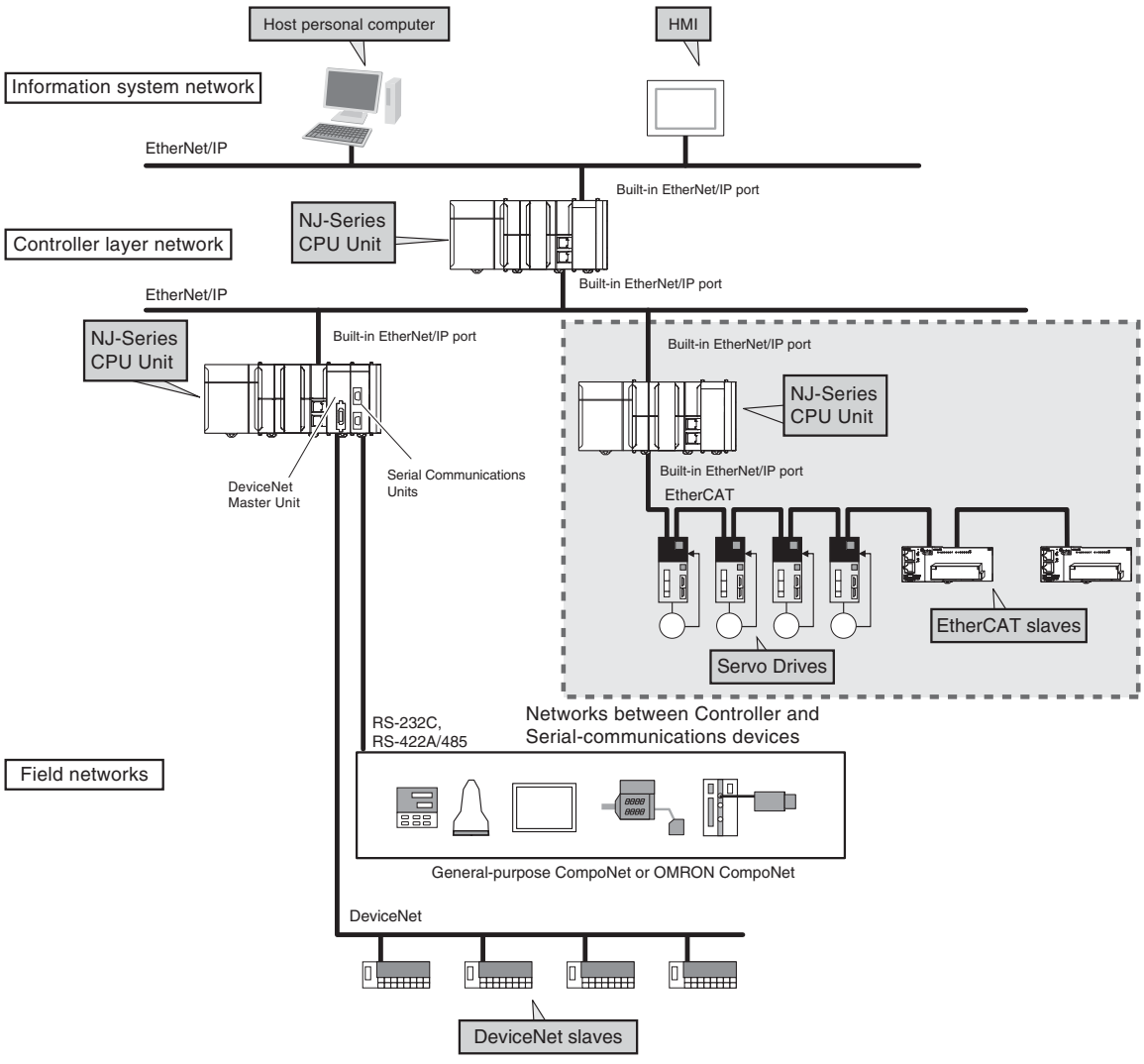
System Configuration

EtherCAT Network Configuration

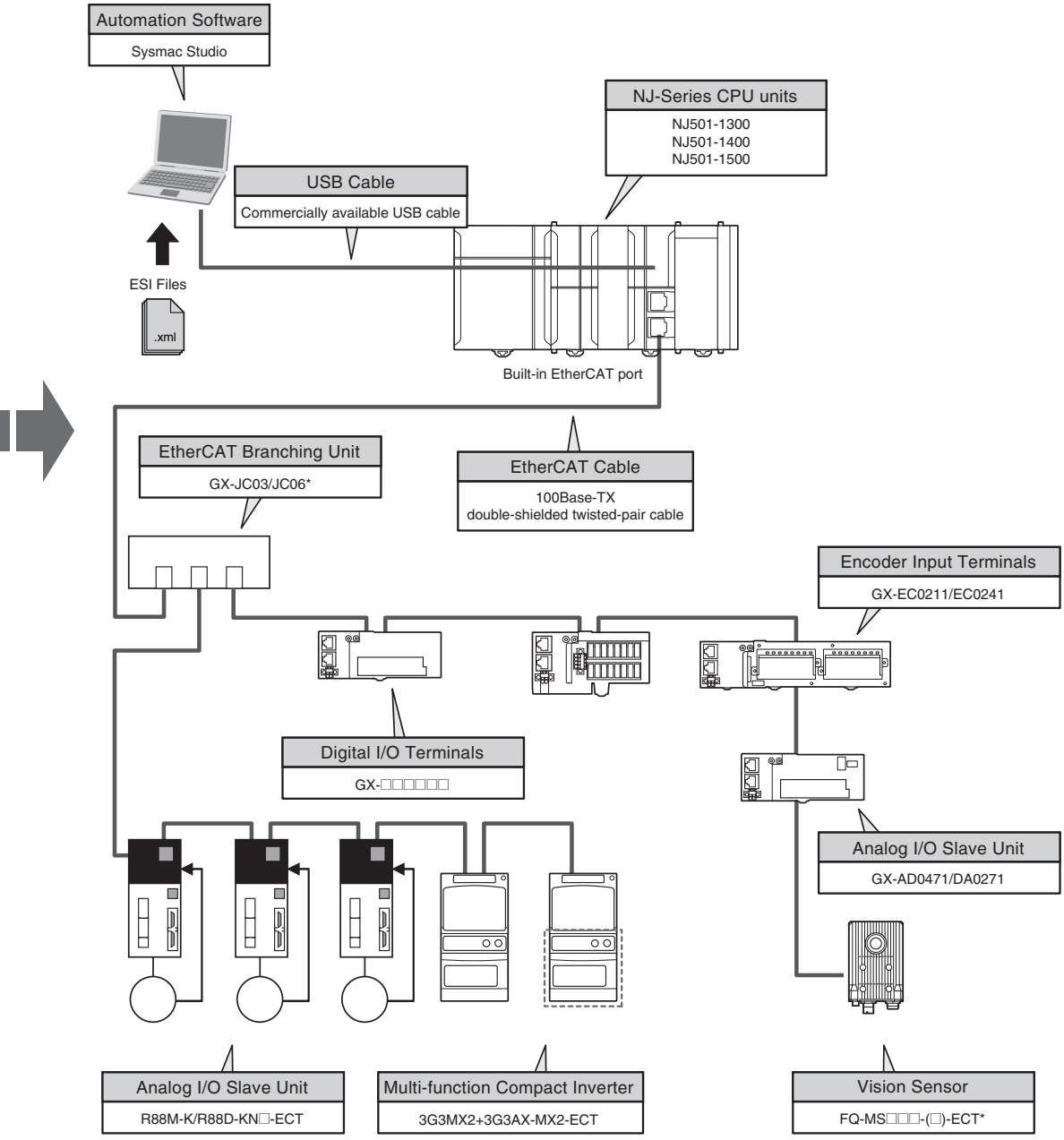
With an NJ-Series, you can use an EtherCAT network as a basic system.



Level	Features	Network type	Protocols	Required devices
Information networks	Message (CIP) communications with host computer	EtherNet/IP	• CIP message communications • FTP server • Socket service • NTP client	Built-in EtherNet/IP port
Networks between Controllers	Tag data links between Controllers	EtherNet/IP	• Tag data link communications • CIP message communications • Socket service	
Networks between Controllers and serial-communications devices	Wide range of protocol selections	Serial Communications	Protocol Macro, No-protocol, CompoWay/F, Modbus, NT Link, and Host Link	Serial Communications Units
Field networks	High-speed, highprecision communications with Servo Drives and generalpurpose slaves	EtherCAT	EtherCAT protocol	Built-in EtherCAT port
	High-speed, multipoint, multi-node connection with different types of slaves	DeviceNet	DeviceNet protocol	DeviceNet Master Unit

Network Configuration

You can make networks in the following layers with an NJ-Series Controller.



Machine Automation Controller
NJ-Series

One integrated machine controller that offers speed, flexibility and scalability of software centric architecture without compromising on the traditional reliability and robustness that you have come to expect from our PLCs.

NJ501-1500

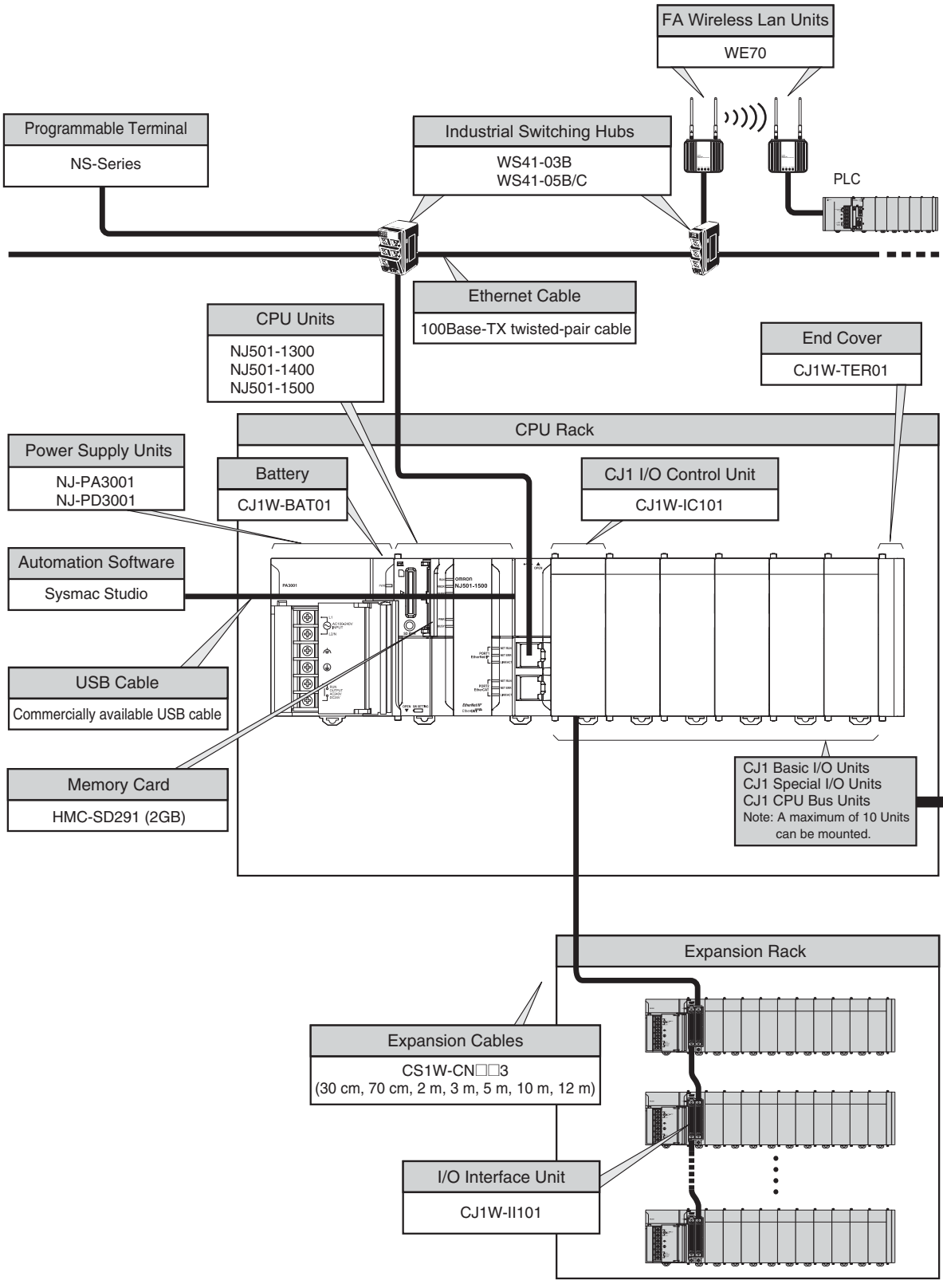
Features

- Architecture based on the Intel® Atom™ processor achieves high-speed processing.
  - The user program including the double precision floating point arithmetic instruction that is necessary for the coordinates correction, ST language and Function Blocks is executed fast, as well as the basic instructions and the special instructions.
- Integration of Logic and Motion in one CPU.
- Synchronous control of all machine network devices : vision sensors, servo drives and field devices with the machine control network, EtherCAT.
  Synchronize the PLC Engine and the Motion Engine with the EtherCAT control period. Fast and highly-accurate control is possible.
- Standard programming : Conforms IEC 61131-3 standards, variable-based instructions including the PLCopen Motion function blocks
- Complete and robust machine automation: fast control performance and basic functions and reliability of industrial controllers.
  - Fan-free operation in ambient temperature between 0 to 55°C.
  - Complete RAS functions: Transmission frame error check, timeout, bus diagnosis, Watchdog (WDT), memory check, and topology check, etc.

This product incorporates certain third party software.
The license and copyright information associated with this software is available at http://www.fa.omron.co.jp/nj_info_e/ .

Unit Configuration

Basic System



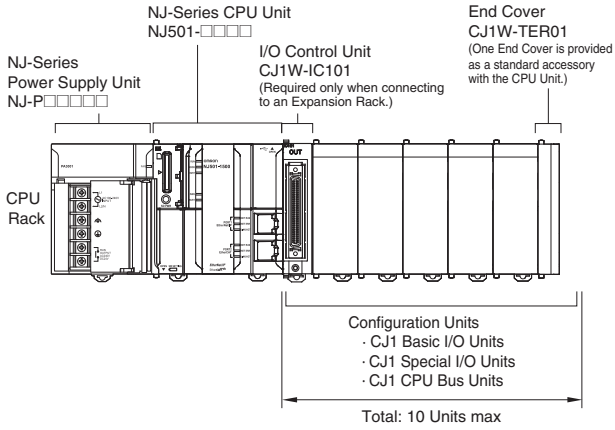
Configuration Units

CJ1 Basic I/O Units			
8-point Units	**16-point Units**	**32-point Units**	**64-point Units**
Input Units			
● DC Input Unit CJ1W-ID201 ● AC Input Unit CJ1W-IA201	● DC Input Unit CJ1W-ID211 CJ1W-ID212 High-speed type ● AC Input Unit CJ1W-IA111	● DC Input Unit CJ1W-ID231 CJ1W-ID232 CJ1W-ID233 High-speed type	● DC Input Unit CJ1W-ID261 CJ1W-ID262
Output Units			
● Relay Contact Output Unit (independent commons) CJ1W-OC201 ● Triac Output Unit CJ1W-OA201 ● Transistor Output Units CJ1W-OD201 CJ1W-OD203 CJ1W-OD202 CJ1W-OD204	● Relay Contact Output Unit CJ1W-OC211 ● Transistor Output Units CJ1W-OD211 CJ1W-OD213 High-speed type CJ1W-OD212	● Transistor Output Units CJ1W-OD231 CJ1W-OD233 CJ1W-OD234 High-speed type CJ1W-OD232	● Transistor Output Units CJ1W-OD261 CJ1W-OD263 CJ1W-OD262
I/O Units			
---	---	(16 inputs, 16 outputs) ● DC Input/Transistor Output Units CJ1W-MD231 CJ1W-MD233 CJ1W-MD232	32 inputs, 32 outputs ● DC Input/Transistor Output Units CJ1W-MD261 CJ1W-MD263 32 inputs, 32 outputs ● TTL I/O Unit CJ1W-MD563
Other Units			
---	● Quick-response Input Unit CJ1W-IDP01	---	● B7A Interface Units (64 inputs) CJ1W-B7A14 (64 outputs) CJ1W-B7A04 (32 inputs, 32 outputs) CJ1W-B7A22

CJ1 Special I/O Units and CPU Bus Units			
■ Process I/O Units ● Isolated-type Units with Universal Inputs CJ1W-PH41U CJ1W-AD04U ● Isolated-type DC Input Unit CJ1W-PDC15 ■ Analog I/O Units ● Analog Input Units CJ1W-AD042 High-speed type CJ1W-AD081-V1 CJ1W-AD041-V1 ● Analog Output Units CJ1W-DA042V High-speed type CJ1W-DA08V CJ1W-DA08C CJ1W-DA041 CJ1W-DA021 ● Analog I/O Units CJ1W-MAD42 ■ Temperature Control Units CJ1W-TC003, CJ1W-TC004 CJ1W-TC103, CJ1W-TC104	■ High-speed Counter Units CJ1W-CT021	■ Serial Communications Units CJ1W-SCU22 High-speed type CJ1W-SCU32 High-speed type CJ1W-SCU42 High-speed type ■ DeviceNet Unit CJ1W-DRM21	■ ID Sensor Units CJ1W-V680C11 CJ1W-V680C12

NJ-Series CPU Racks

A NJ-Series CPU Rack consists of a CPU Unit, Power Supply Unit, Configuration Units (Basic I/O Units, Special I/O Units, and CPU Bus Units), and an End Cover.



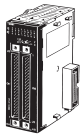
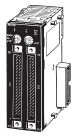
Even though the NJ-Series Controllers do not have Backplanes, the term “slot” still used to refer to the location of Units. Slot numbers are assigned in order to Units from left to right on the CPU Rack (slot 0, slot 1, slot 2, etc.).

- **Required Units**

Rack	Unit name	Required number of Units
CPU Rack	**NJ-Series Power Supply Unit**	1
	NJ-Series CPU Unit	1
	I/O Control Unit	Required only for mounting to an Expansion Rack. Mount the I/O Control Unit immediately to the right of the CPU Unit.
	Number of Configuration Units	10 max. (Same for all models of CPU Unit.) (The number of Basic I/O Units, Special I/O Units, and CPU Bus Units can be varied. The number does not include the I/O Control Unit.)
	End Cover	1 (Included with CPU Unit.)

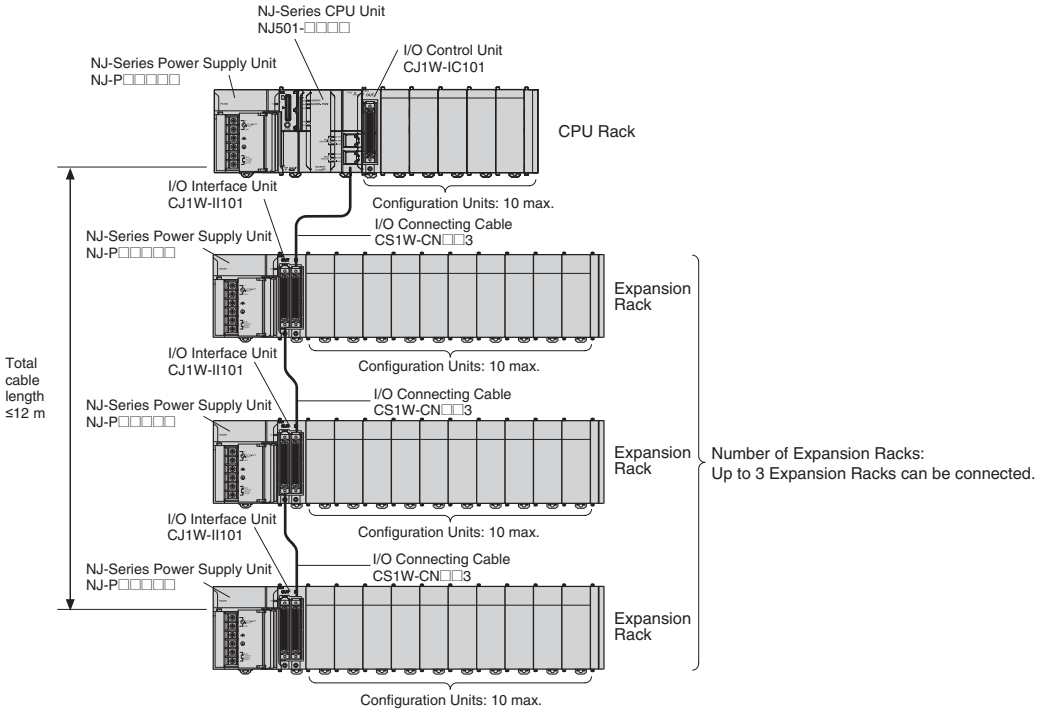
- **Types of Configuration Units**

In the NJ-Series, Configuration Units are classified into the following three types. The number of Racks differs depending on the type.

Type	Appearance (example)	Description	Unit recognition method	Max. Units mountable per CPU Unit
Basic I/O Units		Units with contact inputs and contact outputs.	Recognized by the CPU Unit according to the position of the Rack and slot.	A maximum of 40 Units can be mounted.
Special I/O Units		Special I/O Units provide more advanced functions than do Basic I/O Units, including I/O other than contact inputs and contact outputs. Examples of Special I/O Units are Analog I/O Units and High-speed Counter Units. They differ from CPU Bus Units (including Network Communications Units) in having a smaller area for exchanging data with the CPU Unit.	Recognized by the CPU Unit according to the unit number (0 to 95) set with the rotary switches on the front panel.	A maximum of 40 Units can be connected. (Multiple unit numbers are allocated per Unit, depending on the model and settings.)
CPU Bus Units		CPU Bus Units exchange data with the CPU Unit via the CPU Bus. Examples of CPU Bus Units are Network Communications Units and Serial Communications Units. They differ from Special I/O Units in having a larger area for exchanging data with the CPU Unit.	Recognized by the CPU Unit according to the unit number (0 to F) set with the rotary switch on the front panel.	A maximum of 16 Units can be mounted.

NJ-Series Expansion Racks

A NJ-Series Expansion Rack consists of a Power Supply Unit, an I/O Interface Unit, Configuration Units (Basic I/O Units, Special I/O Units, and CPU Bus Units), and an End Cover.



- **Required Units**

Rack	Unit name	Required number of Units
CPU Rack	**I/O Control Unit**	One Unit. Required only when an Expansion Rack is used. Mount the I/O Control Unit immediately to the right of the CPU Unit. *1
Expansion Rack	**Power Supply Unit**	One Unit
	I/O Interface Unit	One Unit. Mount the I/O Interface Unit immediately to the right of the Power Supply Unit. *2
	Number of Configuration Units	Ten Units max. (The number of Basic I/O Units, Special I/O Units, and CPU Bus Units can be varied. This number does not include the I/O Interface Unit.)
	End Cover	One (Included with the I/O Interface Unit.)

*1 Mounting the I/O Control Unit in any other location may cause faulty operation.
*2 Mounting the I/O Interface Unit in any other location may cause faulty operation.

Configuration Units

- **Maximum Number of Configuration Units That Can Be Mounted**

CPU Unit	Model	Total Units	No. of Units on CPU Rack	No. of Expansion Racks
NJ-Series CPU Unit	NJ501-1300	40	10 per Rack	3 Racks x 10 Units
	NJ501-1400			
	NJ501-1500			

Note: It may not be possible to mount the maximum number of configuration Units depending on the specific Units that are mounted. Refer to the next page for details.

- **Number of mountable units per Configuration Unit**

Basic I/O Units, Special I/O Units, and CPU Bus Units of the CJ-Series are used as Configuration Units of the NJ-Series. All Basic I/O Units are useable. Not all Special I/O Units and CPU Bus Units can be used. Units that can be used are shown in the list. In addition, note that the number of units that can be connected to one CPU vary depending on the units.

CJ-Series Special I/O Units

Type	Name	Specifications	Model	Unit No.	Number of words allocated	Words allocated in DM Area	Number of mountable Units	Current consumption (A)		Weight
								5 VDC	24 VDC	
Special I/O Units	General-purpose Universal Analog Input Unit	4 inputs, fully universal	CJ1W-AD04U	0 to 95	10 words	100 words	40 Units	0.32	---	150 g max.
	Analog Input Units	8 inputs (4 to 20 mA, 1 to 5 V, etc.)	CJ1W-AD081-V1	0 to 95	10 words	100 words	40 Units	0.42	---	140 g max.
		4 inputs (4 to 20 mA, 1 to 5 V, etc.)	CJ1W-AD041-V1	0 to 95	10 words	100 words	40 Units	0.42	---	140 g max.
		4 inputs (4 to 20 mA, 1 to 5 V, etc.)	CJ1W-AD042	0 to 95	10 words	100 words	40 Units	0.52	---	150 g max.
	Analog Output Units	4 outputs (1 to 5 V, 4 to 20 mA, etc.)	CJ1W-DA041	0 to 95	10 words	100 words	40 Units	0.12	---	150 g max.
		2 outputs (1 to 5 V, 4 to 20 mA, etc.)	CJ1W-DA021	0 to 95	10 words	100 words	40 Units	0.12	---	150 g max.
		8 outputs (1 to 5 V, 0 to 10 V, etc.)	CJ1W-DA08V	0 to 95	10 words	100 words	40 Units	0.14	---	150 g max.
		8 outputs (4 to 20 mA)	CJ1W-DA08C	0 to 95	10 words	100 words	40 Units	0.14	---	150 g max.
		4 outputs (1 to 5 V, 0 to 10 V, etc.)	CJ1W-DA042V	0 to 95	10 words	100 words	40 Units	0.40	---	150 g max.
	Analog I/O Unit	4 inputs (1 to 5 V, 4 to 20 mA, etc.) 2 outputs (1 to 5 V, 4 to 20 mA, etc.)	CJ1W-MAD42	0 to 95	10 words	100 words	40 Units	0.58	---	150 g max.
	Isolated-type High-resolution Universal Input Unit	4 inputs, fully universal Resolution: 1/256,000, 1/64,000, 1/16,000	CJ1W-PH41U	0 to 95	10 words	100 words	40 Units	0.30	---	150 g max.
	Direct Current Input Unit	DC voltage or DC current, 2 inputs	CJ1W-PDC15	0 to 95	10 words	100 words	40 Units	0.18	---	150 g max.
	Temperature Control Units	2 control loops, thermocouple inputs, NPN outputs, heater burnout detection	CJ1W-TC003	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
		2 control loops, thermocouple inputs, PNP outputs, heater burnout detection	CJ1W-TC004	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
		2 control loops, temperature-resistance thermometer inputs, NPN outputs, heater burnout detection	CJ1W-TC103	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
		2 control loops, temperature-resistance thermometer inputs, PNP outputs, heater burnout detection	CJ1W-TC104	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
	ID Sensor Units	V680-Series single-head type	CJ1W-V680C11	0 to 95	10 words	100 words	40 Units	0.26	0.13	120 g max.
		V680-Series two-head type	CJ1W-V680C12	0 to 94	20 words	200 words	40 Units	0.32	0.26	130 g max.
	High-speed Counter Unit	Number of counter channels: 2, Maximum input frequency: 500 kHz, line driver compatible	CJ1W-CT021	0 to 92 (uses words for 4 unit numbers)	40 words	400 words	24 Units	0.28	---	100 g max.

CJ-Series CPU Bus Units

Type	Name	Specifications	Model	Unit No.	Number of words allocated	Maximum number of Units	Current consumption (A)		Weight
							5 VDC	24 VDC	
CPU Bus Units	Serial Communications Units	Two RS-232C ports High-speed models	CJ1W-SCU22	0 to F	25 words	16 Units	0.28 *1	---	160 g max.
		Two RS-422A/485 ports High-speed models	CJ1W-SCU32				0.4		120 g max.
		One RS-232C port and one RS-422A/485 port High-speed models	CJ1W-SCU42				0.36 *1		140 g max.
	DeviceNet Unit	DeviceNet remote I/O, 2,048 points; Both Master and Slave functions, Automatic allocation possible without Configurator	CJ1W-DRM21	0 to F	25 words	16 Units	0.29	---	118 g max. *2

*1 Increases by 0.15 A/Unit when an NT-AL001 RS-232C/RS-422A Link Adapter is used. Increases by 0.04 A/Unit when a CJ1W-CIF11 RS-422A Converter is used. Increases by 0.20 A/Unit when an NV3W-M□20L Programmable Terminal is used.
*2 Includes the weight of accessory connectors.

Power Supply Units Current Consumption

Checking Current Consumption and Power Consumption

After selecting a Power Supply Unit based on considerations such as the power supply voltage, calculate the current and power requirements for each Rack.

Condition 1: Current Requirements
There are two voltage groups for internal power consumption: 5 V and 24 V.
Current consumption at 5 V (internal logic power supply)
Current consumption at 24 V (relay driving power supply)

Condition 2: Power Requirements
For each Rack, the upper limits are determined for the current and power that can be provided to the mounted Units. Design the system so that the total current consumption for all the mounted Units does not exceed the maximum total power or the maximum current supplied for the voltage groups shown in the following tables.
The maximum current and total power supplied for CPU Racks and Expansion Racks according to the Power Supply Unit model are shown below.

Note: 1. For CPU Racks, include the CPU Unit current and power consumption in the calculations. When expanding, also include the current and power consumption of the I/O Control Unit in the calculations.
2. For Expansion Racks, include the I/O Interface Unit current and power consumption in the calculations.

Power Supply Units	Max. current supplied			(C) Max. total power supplied
	(A) 5-VDC CPU Racks*	(A)5-VDC Expansion Rack	(B) 24 VDC	
NJ-PA3001	6.0 A	6.0 A	1.0 A	30 W
NJ-PD3001	6.0 A	6.0 A	1.0 A	30 W

* Including supply to the CPU Unit.

Conditions 1 and 2 below must be satisfied.
Condition 1: Maximum Current
(1) Total Unit current consumption at 5 V ≤ (A) value
(2) Total Unit current consumption at 24 V ≤ (B) value
Condition 2: Maximum Power
(1) × 5 V + (2) × 24 V ≤ (C) value

Example: Calculating Total Current and Power Consumption

Example: When the Following Units are Mounted to a NJ-Series CPU Rack Using a NJ-PA3001 Power Supply Unit

Unit type	Model	Quantity	Voltage group	
			5 V	24 V
CPU Unit	NJ501-1500	1	1.90 A	---
I/O Control Unit	CJ1W-IC101	1	0.02 A	---
Basic I/O Units (Input Units)	CJ1W-ID211	2	0.08 A	---
	CJ1W-ID231	2	0.09 A	---
Basic I/O Units (Output Units)	CJ1W-OC201	2	0.09 A	0.048 A
Special I/O Unit	CJ1W-DA041	1	0.12 A	---
CPU Bus Unit	CJ1W-SCU22	1	0.28 A	---
Current consumption	Total		1.9 A+0.02 A+0.08 A × 2+0.09 A × 2+0.09 A × 2+0.12 A+0.28	0.048 A × 2
	Result		2.84 A (≤ 6.0 A)	0.096 A (≤ 1.0 A)
Power consumption	Total		2.84 × 5 V = 14.2 W	0.096 A × 24 V = 2.3 W
	Result		14.2 W + 2.3 W = 16.5 W (≤ 30 W)	

Note: For details on Unit current consumption, refer to Ordering Information.

Using the Sysmac Studio to Display Current Consumption and Width

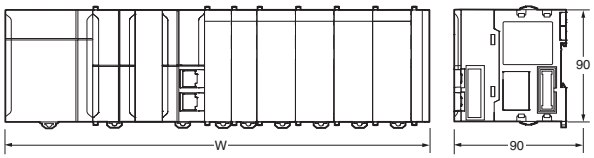
CPU Rack and Expansion Rack current consumption and width can be displayed by selecting ***CPU/Expansion Racks*** from the ***Configurations and Setup*** in the Multiview Explorer. If the capacity of the Power Supply Unit is exceeded, an error icon is displayed in the power supply unit of a corresponding rack. For details, refer to Symac Studio Version 1 Operation manual (W504).

Dimensions

Note: Units are in mm unless specified otherwise.

Product Dimensions

● **Dimensions**



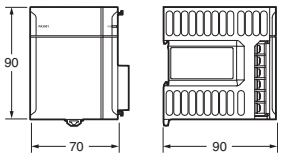
Example Rack Widths using NJ-PA3001 Power Supply Unit (AC)

No. of Units mounted with 31-mm width	Rack width (mm)
	With NJ501-1500
1	205.7
2	236.7
3	267.7
4	298.7
5	329.7
6	360.7
7	391.7
8	422.7
9	453.7
10	484.7

● Power Supply Units, CPU Units, and End Covers

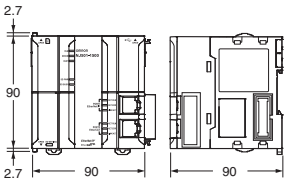
Unit/product	Model	Width
Power Supply Unit	NJ-PA3001	70
	NJ-PD3001	70
CPU Unit	NJ501-□□□□	90
End Cover	CJ1W-TER01	14.7

● Power Supply Units

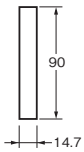


W=70 :NJ-PA3001
:NJ-PD3001

● CPU Units
NJ501-□□□□



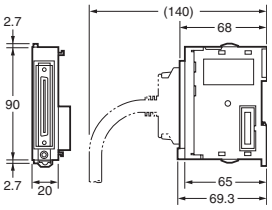
● End Cover
(included with CPU Units)



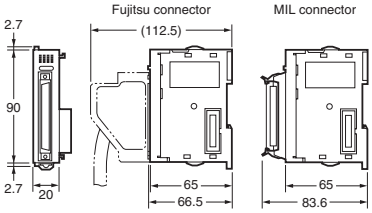
● Units of Width 20 mm

Unit/product	Model	Width
I/O Control Unit	CJ1W-IC101	20
32-point Basic I/O Units	CJ1W-ID231/232/233	
	CJ1W-OD231/232/233/234	
B7A Interface Unit	CJ1W-B7A22 CJ1W-B7A14 CJ1W-B7A04	

● I/O Control Unit



● 32-Point I/O Units (CJ1W-ID223□/OD23□)

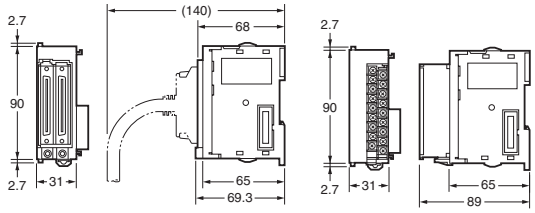


● Units of Width 31 mm

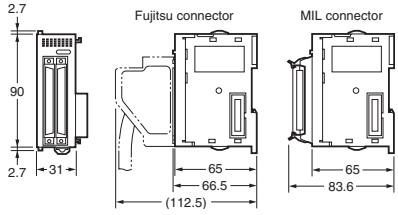
Unit	Model	Width
I/O Interface Unit	CJ1W-II101	31
8/16-point Basic I/O Units	CJ1W-ID201 CJ1W-ID211/212 CJ1W-IA111/201 CJ1W-OD20□ CJ1W-OD211/212/213 CJ1W-OC201/211 CJ1W-OA201	
32-point Basic I/O Units	CJ1W-MD231 CJ1W-MD232/233	
64-point Basic I/O Units	CJ1W-ID261 CJ1W-OD261 CJ1W-MD261	
	CJ1W-ID262 CJ1W-OD262/263 CJ1W-MD263 CJ1W-MD563	
Quick-response Input Unit	CJ1W-IDP01	
Analog I/O Units	CJ1W-AD□□□ (-V1) CJ1W-DA□□□ (□) CJ1W-MAD42	
Process Input Units	CJ1W-PH41U CJ1W-AD04U CJ1W-PDC15	
Temperature Control Units	CJ1W-TC□□□	
High-speed Counter Unit	CJ1W-CT021	
ID Sensor Units	CJ1W-V680C11 CJ1W-V680C12	
Serial Communications Units	CJ1W-SCU22 CJ1W-SCU32 CJ1W-SCU42	
DeviceNet Unit	CJ1W-DRM21	

● I/O Interface Unit

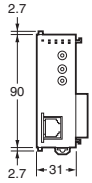
● 8/6-point Basic I/O Units, and High-speed Input Unit



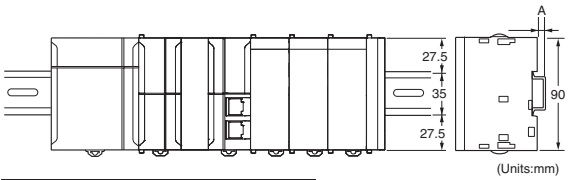
● 64-point Basic I/O Units and 32-point Basic I/O Units (CJ1W-MD23□)



● Special I/O Units and CPU Bus Units



Mounting Dimensions

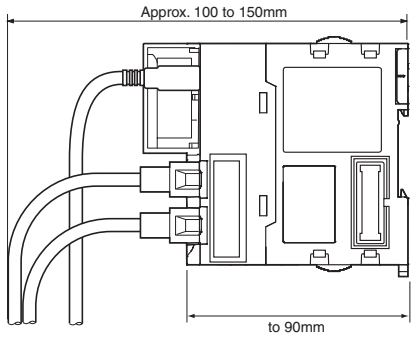


(Units:mm)

DIN Track model number	A
PFP-100N2	16 mm
PFP-100N	7.3 mm
FPP-50N	7.3 mm

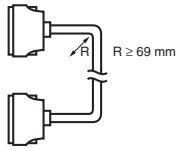
Mounting Height

With a height of 90.0 mm, the CPU Unit is the highest component in an NJ-Series CPU Rack. It is also higher than any Units on an Expansion Rack. When a cable is connected (such as a connecting cable to Support Software), however, even greater height is required. Allow sufficient depth in the control panel containing the Controller.



Note: Consider the following points when expanding the configuration:
The total length of I/O Connecting Cable must not exceed 12 m.
I/O Connecting Cables require the bending radius indicated below.

Expansion Cable



Note: Outer diameter of cable: 8.6 mm.

General Specifications

Item		NJ501-1300	NJ501-1400	NJ501-1500
Enclosure		Mounted in a panel		
Grounding		Less than 100 Ω		
CPU Unit Dimensions (H × D × W)		90 mm × 90 mm × 90 mm		
Weight		550 g (including End Cover)		
Current Consumption		5 VDC, 1.90 A (including SD Memory Card and End Cover)		
Operation Environment	Ambient Operating Temperature	0 to 55°C		
	Ambient Operating Humidity	10% to 90% (with no condensation)		
	Atmosphere	Must be free from corrosive gases.		
	Ambient Storage Temperature	-20 to +75°C (excluding battery)		
	Altitude	2,000 m or less		
	Pollution Degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.		
	Noise Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4.)		
	Overvoltage Category	Category II: Conforms to JIS B3502 and IEC 61131-2.		
	EMC Immunity Level	Zone B		
	Vibration Resistance	Conforms to IEC60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz Acceleration of 9.8 m/s^2 for 100 min in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)		
	Shock Resistance	Conforms to IEC60068-2-27. 147 m/s^2, 3 times in X, Y, and Z directions (100 m/s^2 for Relay Output Units)		
Battery	Life	5 years at 25°C		
	Model	CJ1W-BAT01		
Applicable Standards		Conforms to cULus, NK, LR and EC Directives.		

Performance Specifications

Item			NJ501-1300	NJ501-1400	NJ501-1500
Processing Speed	Execution Time		Ladder Diagram Instructions (LD · AND · OR · OUT) : 1.9 ns min.		
			Math Instructions (LREAL) : 2.6 ns min.		
Programming	Program capacity		20 MB (execution objects and variable tables (including variables))		
	Memory capacity for variables	Variables with Retain attribute (Does not include Holding, DM, and EM Area memory for CJ-Series Units.)	2 MB		
		Variables without Retain attribute (Does not include CIO and Work Area memory for CJ-Series Units.)	4 MB		
	Memory for CJ-Series Units (Can be specified with AT specifications for variables.)	CIO Area	6,144 words (CIO 0 to CIO 6143)		
		Work Area	512 words (W0 to W511)		
		Holding Area	1,536 words (H0 to H1535)		
		DM Area	32,768 words (D0 to D32767)		
		EM Area	32,768 words × 25 banks (E0_00000 to E18_32767)		
Unit configuration	Maximum number of connectable Units		Maximum per CPU Rack or Expansion Rack: 10 Units Entire Controller: 40 Units		
	Number of Expansion Racks		3 max.		
	I/O capacity		2,560 points max. plus EtherCAT slave I/O capacity		
	Power Supply to CPU Rack and Expansion Racks		NJ-P□3001 Power Supply Unit		
Motion control	Controllable Servo Drives		OMRON G5-series Servo Drives with Built-in EtherCAT Communications		
		Recommended Unit Version	Version 2.1 or higher		
	Recommended encoder input terminals		OMRON GX-Series GX-EC0211/EC0241 EtherCAT Remote I/O Terminals		
		Recommended Unit Version	Version 1.1 or higher		
	Control method		Control commands using EtherCAT communications		
	Control modes		Position control (Cyclic Synchronous Position Control Mode) Velocity control (Cyclic Synchronous Velocity Control Mode) Torque control (Cyclic Synchronous Torque Control Mode)		
	Number of controlled axes	Maximum number of controlled axes	16 axes	32 axes	64 axes
		Single-axis control	16 axes max.	32 axes max.	64 axes max.
		Linear interpolation control	4 axes max. per axes group		
		Circular interpolation control	2 axes per axes group		
	Number of axes groups		32 axes groups max.		
	Display unit		Pulses, millimeters, micrometers, nanometers, inches, or degrees		
	Electronic gear ratio		Command pulses per motor rotation divided by work travel distance per motor rotation		
	Positions that can be managed		Command positions and actual positions		
	Position command values		Negative, positive, or 0 long real data (LREAL) (command units *) * Positions can be set within a 40-bit signed integer range when converted to pulses.		
	Velocity command values		Negative, positive, or 0 long real data (LREAL) (command units/s)		
	Acceleration command values and deceleration command values		Positive or 0 long real data (LREAL) (command units/s^2)		
	Jerk command values		Positive or 0 long real data (LREAL) (command units/s^3)		
	Override factors		0.00% or 0.01% to 500.00%		
	Axis types		Servo axes, virtual servo axes, encoder axes, and virtual encoder axes		
	Motion control period		Same as process data communications period of EtherCAT communications		
	Cams	Number of cam data points	65,535 points max. per cam table 1,048,560 points max. for all cam tables		
		Number of cam tables	640 tables max.		
Communications	Peripheral USB port	Supported services	Sysmac Studio connection		
		Physical layer	USB 2.0-compliant B-type connector		
		Transmission distance	5 m max.		
	Built-in EtherNet/IP port	Communications protocol	TCP/IP, UDP/IP, and BOOTP client		
		Supported services	Sysmac Studio connection, tag data link, CIP message communications, socket service, FTP server, automatic clock adjustment (NTP client), SNMP agent, DNS client.		
		Physical layer	10Base-T or 100Base-TX		
		Media access method	CSMA/CD		
		Modulation	Baseband		
		Topology	Star		
		Baud rate	100 Mbps (100Base-TX)		
		Transmission media	Straight or cross STP (shielded twisted-pair) cable of category 5 (100BASE-TX) or higher		
		Transmission distance	100 m max. (distance between ethernet switch and node)		
		Number of cascade connections	There are no restrictions if an ethernet switch is used.		

Item				NJ501-1300	NJ501-1400	NJ501-1500
Communications	Built-in EtherNet/IP port	CIP service: Tag data links (cyclic communications)		–		
			Number of connections	32		
			Packet interval	10 to 10,000 ms in 1.0 ms increments Can be set for each connection. (Data will be refreshed at the set interval, regardless of the number of nodes.)		
			Permissible communications band	1,000 pps *1 including heartbeat		
			Number of tag sets	32		
			Tag types	Network variables (CIO, Work, Holding, DM, and EM Areas)		
			Number of tags per connection (i.e., per tag set)	8 (Seven tags if Controller status is included in the tag set.)		
			Maximum link data size per node (total size for all tags)	19,200 bytes		
			Maximum data size per connection	600 bytes (Note: Data concurrency is maintained within each connection.)		
			Number of registrable tag sets	32 (1 connection = 1 tag set)		
			Maximum tag set size	600 bytes (Two bytes are used if Controller status is included in the tag set.)		
			Changing tag data link parameters when Controller is in RUN mode	Supported. *2		
			Multi-cast packet \filter *3	Supported.		
		CIP message service: Explicit messages		–		
			Class 3 (number of connections)	32 (clients plus server)		
			UCMM (non-connection type)	Number of clients that can communicate at one time: 32 max. Number of servers that can communicate at one time: 32 max.		
			CIP routing	Supported. Units through which CIP routing is supported: CS1W-EIP21, CJ1W-EIP21, CJ2H-CPU□□-EIP, and CJ2M-CPU3□		
	Built-in EtherCAT port	Communications standard		IEC 61158, Type 12		
		EtherCAT master specifications		Class B (Feature Pack Motion Control compliant)		
		Communications protocol		Special protocol for EtherCAT		
		Supported services		CoE (PDO communications and SDO communications)		
		Synchronized communications		DC (distributed clock)		
		Physical layer		100Base-TX		
		Modulation		Baseband		
		Baud rate		100 Mbps (100Base-TX)		
		Duplex mode		Automatic		
		Topology		Line, daisy chain, and branching		
		Transmission media		Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)		
		Transmission distance		Distance between nodes: 100 m max.		
		Maximum number of slaves		192		
		Maximum process data size		Inputs: 5,736 bytes Outputs: 5,736 bytes However, the maximum number of process data frames is 4.		

*1 Means packets per second, i.e., the number of communications packets that can be sent or received in one second.
*2 However, if port parameters are changed, the relevant EtherNet/IP port is restarted.
Communications for the nodes that were communicating with that port will time out, and then they will be automatically restored.
*3 An IGMP client is mounted for the EtherNet/IP port. If an ethernet switch that supports IGMP snooping is used, filtering of unnecessary multicast packets is performed.

Item			NJ501-1300	NJ501-1400	NJ501-1500
Communications	Built-in EtherNet/IP port	Maximum process data size per slave	Inputs: 1,434 bytes Outputs: 1,434 bytes		
		Communications period	500, 1,000, 2,000, or 4,000 μs		
		Minimum communications period	500 μs		
		Maximum communications period	4,000 μs		
		Sync jitter	1 μs max.		
Internal clock			At ambient temperature of 55°C: -3.5 to +0.5 min error per month At ambient temperature of 25°C: -1.5 to +1.5 min error per month At ambient temperature of 0°C: -3 to +1 min error per month		

Function Specifications

Item				NJ501
Tasks	Function			I/O refresh and the user program are executed in units that are called tasks. Tasks are executed periodically. • Primary periodic task: This task has the highest priority. It is always executed in the specified period. There is only one primary periodic task. • Periodic tasks: Periodic tasks are executed during the unused time between executions of the primary periodic task. There can be three periodic tasks.
	Setup	System service monitoring settings		The execution interval and the percentage of the total user program execution time are monitored for the system services (processes that are executed by the CPU Unit separate from task execution).
		I/O refresh settings		EtherCAT Slaves: Axes assigned to Servo Drives and encoder input slaves: Assigned to the primary periodic task. Other Slaves: Assigned as required to the primary periodic task or a priority-16 periodic task. CJ-Series Units: I/O refreshing is set as required for each Unit in the primary periodic task or a priority-16 periodic task.
	Monitoring	Task execution times		The average, maximum, and minimum execution times are displayed for each task.
Programming	POUs (program organization units)	Programs		POUs that are assigned to tasks.
		Function blocks		POUs that are used to create objects with specific conditions.
		Functions		POUs that are used to create an object that determine unique outputs for the inputs, such as for data processing.
	Programming languages	Types		Ladder diagrams (see note) and structured text (ST) **Note:** Inline ST is supported. (Inline ST is ST that is written as an element in a ladder diagram.)
	Variables	Type of variables	User-defined variables	Variables that are defined by the user.
			Semi-user-defined variables	Variables for which only some of the attributes can be changed.
			System-defined variables	Variables that are defined by the system. None of the attributes of these variables can be changed.
		External access of variables		Network variables (This is set as an attribute of the variable.)
		Initial values	Variables without Retain attribute	Initial values are set when the user program is transferred.
			Variables with Retain attribute	Whether to set initial values can be selected when the user program is transferred.
	Array attribute	Array variables	Function	An array groups data with the same attributes so that it can be handled as a single unit of data. Number of dimensions: 3 max. Maximum number of elements: 65,535
			Array specifications for FB instances	Supported. (Execution of multiple instances is possible by using a variable to indirectly specify an array element number.)
			Protective functions	During programming and program execution, exceeding the number of elements that was defined for the array is detected.
	Data types	Basic data types		BOOL, BYTE, WORD, DWORD, LWORD, INT, SINT, DINT, LINT UINT, USINT, UDINT, ULINT, REAL, LREAL, TIME (durations), DATE, TIME_OF_DAY, DATE_AND_TIME, and STRING (text strings)
		Derivative data types		Structures, unions, and enumerations
		Structures	Function	A derivative data type that groups together data with different variable types. Number of members: 2,048 max. Nesting levels: 8 max.
			Member data types	Basic data types, structures, enumerations, unions, or array variables
		Unions	Function	A derivative data type that enables access to the same data with different data types. Number of members: 4 max.
			Member data types	BOOL, BYTE, WORD, DWORD, or LWORD
		Enumerations Function		A derivative data type that uses text strings called enumerators to express variable values.
		Data type attributes	Array specifications	An array is a group of elements with the same data type. You specify the number (subscript) of the element from the first element to specify the element. You can specify arrays for both basic data types and derivative data types.
			Range specifications	You can specify a range for a data type in advance. The data type can take only values that are in the specified range. You can specify a range for any integer basic data type.
		Program checks		Programming is checked offline with the Sysmac Studio and when instructions are executed.
		Programming support		Rung numbers (ladder diagrams) and line numbers (ST) are displayed. Guidance is provided when inputting instructions. (Item names and data types are displayed for input variables.)

Item				NJ501
Motion control functions *4	Single-axis	Single-axis position control	Absolute positioning	Positioning is performed for a target position that is specified with an absolute value.
			Relative positioning	Positioning is performed for a specified position from the command current position.
			Interrupt feeding	Positioning is performed for a specified travel distance from the position where an interrupt input was received from an external input.
		Single-axis velocity control	Velocity control	Velocity control is performed in Position Control Mode.
			Cyclic synchronous velocity control	A velocity command is output each control period in Velocity Control Mode.
		Single-axis torque control	Torque control	The torque of the motor is controlled.
		Single-axis synchronized control	Starting cam operation	A cam motion is performed using the specified cam table.
			Ending cam operation	The cam motion for the axis that is specified with the input parameter is ended.
			Starting gear operation	A gear motion with the specified gear ratio is performed between a master axis and slave axis.
			Positioning gear operation	A gear motion with the specified gear ratio and sync position is performed between a master axis and slave axis.
			Ending gear operation	The specified gear motion or positioning gear motion is ended.
			Synchronous positioning	Positioning is performed in sync with a specified master axis.
			Master axis phase shift	The phase of a master axis in synchronized control is shifted.
			Combining axes	The command positions of two axes are added or subtracted and the result is output as the command position.
		Single-axis manual operation	Powering the Servo	The Servo in the Servo Drive is turned ON to enable axis motion.
			Jogging	An axis is jogged at a specified target velocity.
		Auxiliary functions for single-axis control	Resetting axis errors	Axes errors are cleared.
			Homing	A motor is operated and the limit signals, home proximity signal, and home signal are used to define home.
			High-speed homing	Positioning is performed for an absolute target position of 0 to return to home.
			Stopping	An axis is decelerated to a stop.
			Immediately stopping	An axis is stopped immediately.
			Setting override factors	The target velocity of an axis can be changed.
			Changing the current position	The command current position or actual current position of an axis can be changed to any position.
			Enabling external latches	The position of an axis is recorded when a trigger occurs.
			Disabling external latches	The current latch is disabled.
			Zone monitoring	You can monitor the command position or actual position of an axis to see when it is within a specified range (zone).
			Monitoring axis following error	You can monitor whether the difference between the command positions or actual positions of two specified axes exceeds a threshold value.
			Resetting the following error	The error between the command current position and actual current position is set to 0.
			Torque limit	The torque control function of the Servo Drive can be enabled or disabled and the torque limits can be set to control the output torque.

*4. When connected to an OMRON G5-Series Servo Drive with built-in EtherCAT communications.

Item				NJ501
Motion control functions *5	Axes groups	Multi-axes coordinated control	Absolute linear interpolation	Linear interpolation is performed to a specified absolute position.
			Relative linear interpolation	Linear interpolation is performed to a specified relative position.
			Circular 2D interpolation	Circular interpolation is performed for two axes.
		Auxiliary functions for multi-axes coordinated control	Resetting axes group errors	Axes group errors and axis errors are cleared.
			Enabling axes groups	Motion of an axes group is enabled.
			Disabling axes groups	Motion of an axes group is disabled.
			Stopping axes groups	All axes in interpolated motion are decelerated to a stop.
			Immediately stopping axes groups	All axes in interpolated motion are stopped immediately.
			Setting axes group override factors	The blended target velocity is changed during interpolated motion.
	Common items	Cams	Setting cam table properties	The end point index of the cam table that is specified in the input parameter is changed.
			Saving cam tables	The cam table that is specified with the input parameter is saved in non-volatile memory in the CPU Unit.
		Parameters	Writing MC settings	Some of the axis parameters or axes group parameters are overwritten temporarily.
	Auxiliary functions	Count modes		You can select either Linear Mode (finite length) or Rotary Mode (infinite length).
		Unit conversions		You can set the display unit for each axis according to the machine.
		Acceleration/ deceleration control	Automatic acceleration/ deceleration control	Jerk is set for the acceleration/deceleration curve for an axis motion or axes group motion.
			Changing the acceleration and deceleration rates	You can change the acceleration or deceleration rate even during acceleration or deceleration.
		In-position check		You can set an in-position range and in-position check time to confirm when positioning is completed.
		Stop Mode		You can set the Stop Mode to determine when the immediate stop input signal or limit input signal is valid.
		Re-execution of motion control instructions		You can change the input variables for a motion control instruction during execution and execute the instruction again to change the target values during operation.
		Multi-execution of motion control instructions (Buffer Mode)		You can specify when to start execution and how to connect the velocities between operations when another motion control instruction is executed during operation.
		Continuous axes group motions (Transition Mode)		You can specify the Transition Mode for multi-execution of instructions for axes group operation.
		Monitoring functions	Software limits	Software limits are set for each axis.
			Following error	The error between the command current value and the actual current value is monitored for each axis.
			Velocity, acceleration rate, deceleration rate, torque, interpolation velocity, interpolation acceleration rate, and interpolation deceleration rate	The warning value is monitored for each axis and each axes group.
		Absolute encoder support		You can use an OMRON G5-Series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup.
	External interface signals			The following Servo Drive input signals are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal

*5. When connected to an OMRON G5-series Servo Drive with built-in EtherCAT communications.

Item				NJ501
Unit (I/O) management	CJ-Series Units	I/O allocations		Use one of the following procedures. • Creating the Unit configuration offline with Sysmac Studio • Creating the Unit configuration online by reading the actual Unit configuration with the Sysmac Studio
		Basic I/O Units	Chattering and noise countermeasures	Input response times are set.
			Load shortcircuit protection and I/O disconnection detection	Alarm information for Basic I/O Units is read.
		Special Units	Restarting	Units can be restarted from instructions, system-defined variables, and the Sysmac Studio.
			Special Unit Setup	Special Units can be set up with Unit settings from the Sysmac Studio or by setting device variables.
	EtherCAT slaves	Basic I/O	Chattering and noise countermeasures	Input response times are set.
		Special I/O	Restarting	Restarting is possible from the Sysmac Studio.
Communications	Peripheral USB port			A port for communications with various kinds of Support Software running on a personal computer.
	EtherNet/IP port	CIP communications service	Tag data links	Programless cyclic data exchange is performed with the devices on the EtherNet/IP network.
			Message communications	CIP commands are sent to or received from the devices on the EtherNet/IP network.
			Socket services	Data is sent to and received from any node on Ethernet using the UDP or TCP protocol. Socket communications instructions are used.
			FTP server	Files can be read from or written to the SD Memory Card in the CPU Unit from computers at other Ethernet nodes.
			Automatic clock adjustment	Clock information is read from the NTP server at the specified time or at a specified interval after the power supply to the CPU Unit is turned ON. The internal clock time in the CPU Unit is updated with the read time.
			SNMP agent	Built-in EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager.
	EtherCAT port	Process data communications		Control information is exchanged in cyclic communications between the EtherCAT master and slaves.
		SDO communications		Control information is exchanged in noncyclic event communications between the EtherCAT master and slaves. The following application protocol is supported. CoE (CANopen over EtherCAT)
		Network scanning		Information is read from connected slave devices and the slave configuration is automatically generated.
		DC (distributed clock)		Time is synchronized by sharing the EtherCAT system time between all EtherCAT devices (including the master). To implement the distributed clock, propagation delay compensation, drift compensation, and offset compensation are performed.
	Communications instructions			The following instructions are supported. CIP communications instructions, socket communications instructions, SDO message instructions, no-protocol communications instructions, and protocol macro instructions
Operation management	RUN output contacts			The output on the NJ-P□3001 Power Supply Unit turns ON in RUN mode.
System management functions	Log management	Event logs		The following events are recorded. • Events for the operation of the NJ-Series system itself • Communications events • Security events • Events for the operation of user-designed device applications

Item				NJ501	
Debugging	Online editing			Programs, function blocks, functions, and global variables can be changed online. Individual POUs can be changed by more than one worker working across a network.	
	Forced refreshing			The user can force specific variables to TRUE or FALSE. Device variables for CJ-Series Units and variables with AT specifications: 64 variables max. Device variables for EtherCAT slaves: 64 variables max. **Note:** Forced refreshing values are overwritten by program execution. Refreshing of external outputs uses the forced refreshing values, not the program values.	
	Motion Control Test Mode			Motor operation and wiring can be checked from the Sysmac Studio.	
	Synchronization			The project file in the Sysmac Studio and the data in the CPU Unit can be made the same when online.	
	Data tracing			The specified variables are sampled and stored in trace memory when the specified conditions are met. No programming is required. Maximum number of records: 10,000 records Maximum number of sampled variables: 192 variables	
		Timing of sampling		Sampling is performed for the specified task period, at the specified time, or when a sampling instruction is executed.	
		Starting tracing		When specified from the Sysmac Studio or automatically at startup	
		Triggered traces		Trigger conditions are set to record data before and after an event.	
			Trigger conditions	When BOOL variable changes to TRUE or FALSE Comparison of non-BOOL variable with a constant Comparison Method: Equals (=), Greater than (>), Greater than or equals (≥), Less Than (<), Less than or equals (≤), Not equal (≠)	
			Delay	Trigger position setting: The percentage of sampling before and after the trigger condition is set. (Example: 20%/80%)	
		Continuous tracing		Data tracing is executed continuously and the trace data is collected by the Sysmac Studio.	
	Simulation			The operation of the CPU Unit is emulated in the Sysmac Studio. The following can be emulated: user program execution (including partial emulation), debugging (including step execution and breakpoints), monitoring, tracing, estimating execution times, and Servo Drive signals.	
Maintenance	Connections to HMIs	Connected port		Built-in EtherNet/IP port	
	Sysmac Studio connection	Connected port		Peripheral USB port or built-in EtherNet/IP port	
		Remote programming and monitoring		Connection is possible through the peripheral USB port to other nodes that are connected to the built-in EtherNet/IP port.	
	ID information	Production information		Individual identifiers, lot numbers, and other information is accessed from the Sysmac Studio.	
Reliability functions	Self-diagnosis	Controller errors		• Major faults: Internal bus check errors, main memory check errors, etc. • Partial faults: Motion control period exceeded, slave initialization error, etc. • Minor faults: Battery-backed-up memory check errors, clock oscillation stopped, etc.	
		User-defined errors		User-defined errors are registered in advance and then generated by executing an instruction. Error registration, error resetting, error information registration	
		User-defined error messages		User-defined error messages can be specified in up to nine languages, including Japanese and English.	
	Power supply management	Power OFF Detection Time		AC power supply: 30 to 45 ms DC power supply: 22 to 25 ms	
Security	Protecting software assets and preventing operating mistakes	CPU Unit names and serial IDs		When going online to a CPU Unit from the Sysmac Studio, the CPU Unit name in the project is compared to the name of the CPU Unit being connected to.	
		Protection	Protection for online operations from the Sysmac Studio	User program transfers with no restoration information	Prevents reading data in the CPU Unit from the Sysmac Studio.
				CPU Unit write-protection	Prevents writing data to the CPU Unit from the Sysmac Studio.
			Protection for offline operations from the Sysmac Studio	Protection of all project files	Prohibits opening or copying project files on the Sysmac Studio without a password.
		Verification of operation authority		Online operations are restricted by operation rights to prevent damage to equipment or injuries that may be caused by operating mistakes.	
		Hardware identification (user program execution ID)		The user program cannot be executed without entering a user program execution ID from the Sysmac Studio for the specific hardware (CPU Unit).	

Item			NJ501
SD Memory Card functions	Storage type		SD Memory Card (2 GB max.)
	Application	SD Memory Card operation instructions	You can access SD Memory Cards from instructions in the user program.
		FTP server	You can use FTP commands from an FTP client on an intranet to read and write large files in the SD Memory Card through EtherNet/IP.
		File operations from the Sysmac Studio	You can perform file operations for Controller files in the SD Memory Card and read/write standard document files on the computer.
		SD Memory Card life expiration detection	Notification of the expiration of the life of the SD Memory Card is provided in a systemdefined variable and event log.

Version Information

Unit Versions

Units	Models	Unit Version
NJ501 CPU Units	NJ501-□□□□	Unit version 1.00

Unit Versions and Programming Devices

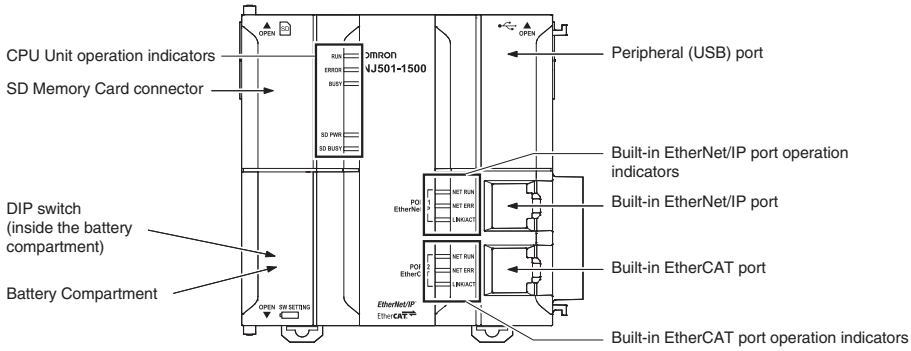
The following tables show the relationship between unit versions and CX-Programmer versions.

Unit Versions and Programming Devices

CPU Unit	Functions	Required Programming Device
		Sysmac Studio
		Ver.1.00
NJ501-□□□□ Unit version 1.00	Functions for unit version 1.00	O

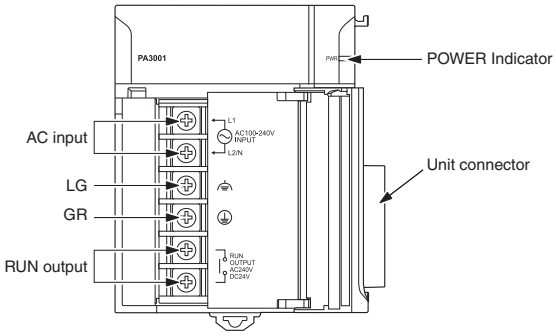
Components and Functions

●NJ501 CPU Unit

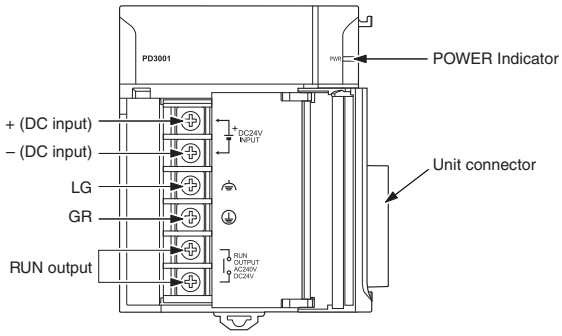


●Power Supply Unit

NJ-PA3001



NJ-PD3001



Sysmac Studio

Sysmac Studio for machine creators

The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves.

Features

- One software for motion, drives and vision
- Fully compliant with open standard IEC 61131-3
- Supports Ladder, Structured Text and Function Block programming with a rich instruction set
- CAM editor for easy programming of complex motion profiles
- One simulation tool for sequence and motion in a 3D environment
- Advanced security function with 32 digit security password.

System Requirements

Item	Requirement
Operating system (OS) (See note 1, 2.) Japanese or English system	Windows XP (Service Pack 3 or higher, 32-bit version)/Vista(32-bit version)/7(32-bit/64-bit version)
CPU	Windows computers with Celeron 540 (1.8 GHz) or faster CPU. Core i5 M520 (2.4 GHz) or equivalent or faster recommended
Main memory (See note 3.)	2GB min.
Recommended video memory / video card for using 3D motion trace	Video memory: 512 MB min. Video card: Either of the following video cards: • NVIDA® GeForce® 200 Series or higher • ATI RadeonHD5000 Series or higher
Hard disk	At least 1.6 GB of available space
Display	XGA 1,024 x 768, 16 million colors WXGA 1,280 x 800 min. recommended
Disk drive	DVD-ROM drive
Communications ports	USB port corresponded to USB 2.0, or Ethernet port (see note 4.)

Note: 1. Sysmac Studio Operating System Precaution: System requirements and hard disk space may vary with the system environment.

2. The following restrictions apply when Sysmac Studio is used with Microsoft Windows Vista or Windows 7

1) Some Help files cannot be accessed.

The Help files can be accessed if the Help program distributed by Microsoft for Windows (WinHlp32.exe) is installed. Refer to the Microsoft homepage listed below or contact Microsoft for details on installing the file. (The download page is automatically displayed if the Help files are opened while the user is connected to the Internet.)

http://support.microsoft.com/kb/917607/en-us

2) The following restrictions apply to some application operations.

Application	Restriction
CX-Designer	If a new Windows Vista or Windows 7 font (e.g., Meiryo) is used in a project, the font size on labels may be bigger and protrude from the components if the project is transferred from CX-Designer running on a Windows XP or earlier OS to the NS/NSJ.
CX-Integrator/Network Configurator	Although you can install CPS files, EDS files, Expansion Modules, and Interface Modules, the virtual store function of Windows Vista or Windows 7 imposes the following restrictions on the use of the software after installation. These restrictions will not exist if application data is installed using Run as Administrator. • If another user logs in, the applications data will need to be installed again. • The CPS files will not be automatically updated.

3. The amount of memory required varies with the Support Software used in Sysmac Studio for the following Support Software. Refer to user documentation for individual Support Software for details.

CX-Designer, CX-Protocol, and Network Configurator

4. Refer to the hardware manual for your Controller for hardware connection methods and cables to connect the computer and Controller.

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Function Specifications

Category			Function
Setting Parameters	EtherCAT Configuration and Setup		You create a configuration in the Sysmac Studio of the EtherCAT slaves connected to the built-in EtherCAT port of the Controller, and setup the EtherCAT masters and slaves in that configuration.
		Registering slaves	You can set up devices by dragging slaves from the device list displayed in the Toolbox Pane to the locations where you want to connect them.
		Setting master parameters	You set the common parameters of the EtherCAT network (e.g., the fail-soft operation and wait time for slave startup settings).
		Setting slave parameters	You set the standard slave parameters and assign PDOs (process data objects).
		Comparing and merging network configuration information	The EtherCAT network configuration information in the NJ-series CPU Unit and in the Sysmac Studio are compared and the differences are displayed.
		Transferring the network configuration information	The EtherCAT network configuration information is transferred to the NJ-series CPU Unit. Or, the EtherCAT network configuration information in the NJ-series CPU Unit is transferred to the Sysmac Studio and displayed in the EtherCAT Editor.
		Importing ESI files	ESI (EtherCAT slave information) files are imported.
	CPU/Expansion Rack Configuration and Setup		You create the configuration in the Sysmac Studio of the Units mounted in the NJ-series CPU Rack and Expansion Racks and the Special Units. You can build a Rack by dragging Units from the device list displayed in the Toolbox Pane to the locations where you want to mount them.
		Registering Units	A Rack is built by dragging Units from the device list displayed in the Toolbox Pane to the locations where you want to mount them.
		Creating Racks	An Expansion Rack (Power Supply Unit, I/O Interface Unit, and End Cover) is added.
		Switching Unit displays	The model number, unit number, and slot number are displayed.
		Setting Special Units	The input time constants are set for Input Units and parameters are set for Special Units.
		Displaying Rack widths, current consumption, and power consumption	The Rack widths, current consumption, and power consumption are displayed based on the Unit configuration information.
		Comparing the CPU/ Expansion Rack configuration information with the physical configuration	When online, you can compare the configuration information in the project with the physical configuration. You can also select the missing Units and add them.
		Transferring the CPU/ Expansion Rack configuration information	The Unit configuration information is transferred to the CPU Unit. The synchronize function is used.
		Printing the Unit configuration information	The Unit configuration information is printed.
	Controller Setup		The Controller Setup is used to change settings related to the operation of the Controller. The Controller Setup contains PLC Function Module operation settings and built-in EtherNet/IP Function Module port settings.
		Operation Settings	The Startup Mode, SD Memory Card diagnosis, Write Protection at Startup, and other settings are made.
		Transferring Operation Settings	Use the synchronize operation to transfer the operation settings to the Controller.
		Built-in EtherNet/IP Port Settings	These settings are made to perform communications using the built-in EtherNet/IP port of the Controller.
		Transferring Built-in EtherNet/ IP Port Settings	Use the synchronize operation to transfer the Built-in EtherNet/IP Port Settings to the Controller.
	Motion Control Setup		The Motion Control Setup is used to create the axes to use in motion control instructions, assign those axes to Servo Drives and encoders, and set axis parameters.
		Axis Setting	Axes are added to the project.
		Axis Setting Table	The Axis Setting Table is a table of all registered axis parameters. You can edit any axis parameters here just as you can on the Axis Settings Tab Page.
	Axes Group Setup		You can set up axes to perform interpolated motions as an axes group.
		Axes Group Basic Settings	Set the axes group number, whether to use the axes group, the composition, and the composition axes.
		Operation Settings	Set the interpolated velocity, the maximum interpolated acceleration and deceleration, and the interpolated operation settings.
	Cam Data Settings		The curve that defines the relationship between the phases and displacements of the cam data is called the cam profile curve. You can create cam profile curves with the Cam Editor.
		Creating cam data	Cam data is added to the project.
		Editing cam data	The profile data is set.
		Transferring cam data	You can select to transfer all or part of the cam data.
		Importing cam data settings	You can import cam data settings from a CSV file.
		Exporting cam data settings	You can export cam data to a CSV file.
		Exporting cam tables	You can export cam data in the data format of the master and slave axes that is used by the Controller.

Category			Function
Setting Parameters	Cam Data Settings	Transferring cam data from the Controller to files	You can save a cam table that was transferred to the Controller to a file in the data format of the master and slave axes.
		Transferring cam data from files to the Controller	You can transfer the data from a cam data file in the data format of the master and slave axes to update the contents of the cam data that is already in the Controller.
	Task Setup		Programs are executed in tasks in an NJ-series CPU Unit. The Task Setup defines the execution period, the execution timing, the programs executed by the task, the I/O refreshing performed by the task, and which variables to share between tasks.
		Registering tasks	The tasks, which are used to execute programs, are registered.
		Setting task I/O	The task I/O settings define what Units the task should perform I/O refreshing for.
		Assigning programs	Program assignments define what programs a task will execute.
		Setting exclusive control of variables in tasks	You can specify if a task can write to its own values (known as a refreshing task) or if it can only access them (an accessing task) for global variables. This ensures concurrency for global variable values from all tasks that reference them.
	I/O Map Settings		The I/O ports that correspond to the registered EtherCAT slaves and to the registered Units on the CPU Rack and Expansion Racks are displayed. The I/O Map is edited to assign variables to I/O ports. The variables are used in the user program.
		Displaying I/O ports	I/O ports are displayed based on the configuration information of the devices (slaves and Units).
		Assigning variables	Variables are assigned to I/O ports.
		Creating device variables	Device variables are created in the I/O Map. You can either automatically create a device variable or manually enter the device variable to create.
		Checking I/O assignments	The assignments of external I/O devices and variables are checked.
Programming	Instruction list (Toolbox)		A hierarchy of the instructions that you can use is displayed in the Toolbox. You can drag the required instruction to a program in the Ladder Editor to insert the instruction.
	Programming ladder diagrams		Ladder diagram programming involves connecting rung components with connecting lines to build algorithms. Rung components and connecting lines are entered in the Ladder Editor.
		Starting the Ladder Editor	The Ladder Editor for the program is started.
		Adding and deleting sections	You can divide your ladder diagrams into smaller units for easier management. These units of division are called sections.
		Inserting rung components	You insert rung components in the Ladder Editor to create an algorithm.
		Inserting and deleting function blocks	You can insert a function block instruction or user-defined function block into the Ladder Editor.
		Inserting and deleting functions	You can insert a function instruction or user-defined function into the Ladder Editor.
		Inserting and deleting inline ST	You can insert a rung component in a ladder diagram to enable programming in ST. This allows you to include ST in a ladder diagram.
		Editing rung components	You can copy and past rung components.
		Inserting and deleting jump labels and jumps	You can insert a jump label in the rung to jump to and then specify that jump label when you insert a jump.
		Inserting and deleting bookmarks	You can add bookmarks to the beginning of rungs and move between them.
		Rung comments	You can add comments to rungs.
		Displaying rung errors	When you enter a rung component, the format is always checked and any mistakes are displayed as errors. If there are any errors, a red line is displayed between the rung number and the left bus bar.
		Entry assistance	When you enter instructions or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.
	Programming structured text		You combine different ST statements to build algorithms.
		Starting the ST Editor	The ST Editor for programs or for functions/function blocks is started.
		Editing ST	You combine different ST statements to build algorithms.
		Entering calls to functions and function blocks	You can enter the first character of the instance name of the function or the function block in the ST Editor to call and enter a function or function block.
		Entering constants	You can enter constants in the ST Editor.
		Entering comments	Enter "(*" at the beginning and "*)" at the end of any text to be treated as a comment in the ST Editor. If you only want to comment out a single line, enter a double forward slash (//) at the beginning of the line.
		Copying, pasting, and deleting ST elements	You can copy, paste, and delete text strings.
		Indenting	You can indent nested statements to make them easier to read.
		Moving to a specified line	You can specify a line number to jump directly to that line.
		Bookmarks	You can add bookmarks to any lines and move between them.
		Entry assistance	When you enter instructions or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.
	Finding and replacing		You can search for and replace strings in the data of a project.
	Jumping		You can jump to the specified rung number or line number in the program.
	Building		The programs in the project are converted into a format that is executable in the Controller.
		Rebuilding	A rebuild is used to build project programs that have already been built.
		Aborting a build operation	You can abort a build operation.

Category			Function
File operations	File operations	Creating a project file	A project file is created.
		Opening a project file	A project file is opened.
		Saving the project file	The project file is saved.
		Saving a project file under a different name	A project file is saved under a different name.
		Exporting a project file	You can convert a project file to a .smc file and export it.
		Importing a project file	You can import a project file that was saved in .txs format.
	Cutting, copying, and pasting		You can cut, copy, or paste items that are selected in the Multiview Explorer or any of the editors.
	Synchronize		The project file in the computer is compared with the data in the online NJ-series CPU Unit and any differences are displayed. You can specify the transfer direction for any type of data and transfer all of the data.
	Printing		You can print various data. You can select the items to print.
	Clear All Memory		The Clear All Memory Menu command is used to initialize the user program, Controller Configurations and Setup, and variables in the CPU Unit to the defaults from the Sysmac Studio.
	SD Memory Cards		The following procedures are used to execute file operations for the SD Memory Card mounted in the Controller and to copy files between the SD Memory Card and computer.
		Formatting the SD Memory Card	The SD Memory Card is formatted.
		Displaying properties	The properties of the selected file or folder in the SD Memory Card are displayed.
		Copying files and folders in the SD Memory Card	The selected file or folder in the SD Memory Card is copied to the SD Memory Card.
		Copying files and folders between the SD Memory Card and the computer	The selected file or folder in the SD Memory Card is copied to the computer. Or, the selected file or folder in the computer is copied to the SD Memory Card.
Debugging	Monitoring		Variables are monitored during ladder program execution. You can monitor the TRUE/FALSE status of inputs and outputs and the present values of variables in the Controller. You can monitor operation on the Ladder Editor, ST Editor, Watch Tab Page, or I/O Map.
	Changing present values and TRUE/FALSE		You can change the values of variables that are used in the user program and settings to any desired value, and you can change program inputs and outputs to TRUE or FALSE. This allows you to check the operation of the user program and settings.
	Changing the present values of variables		You can change the present values of user-defined variables, system-defined variables, and device variables as required. You can do this in the Watch Tab Page or I/O Map.
	Forced refreshing		You select a BOOL variable and make the assigned I/O port or AT specification bit in memory for CJ-series Units change to TRUE or FALSE to force refreshing with external devices. The specified value is retained even if the value of the variable is overwritten from the user program. You can use forced refreshing to force BOOL variables to TRUE or FALSE in the Ladder Editor, Watch Tab Page, or I/O Map.
	Online editing		Online editing allows you to edit programs on systems that are currently in operation. Online editing can be used to edit only POUs and global variables. User-defined data types cannot be edited with online editing.
	Cross Reference Tab Page		Cross references allow you to see the programs and locations where program elements (variables, data types, I/O ports, functions, or function blocks) are used. You can view all locations where an element is used from this list.
	Data tracing		Data tracing allows you to sample the specified variables and store the values of the variables in trace memory without any programming. You can choose between two continuous trace methods: a triggered trace, where you set a trigger condition and data is saved before and after that condition is met, or a continuous trace, in which continuous sampling is performed without any trigger and the results are stored in a file on your computer. However, you can still display data retrieved on the Sysmac Studio and save those results to a file even if you use a triggered trace. These same functions can be used with the Simulator as well.
		Setting sampling intervals	The interval to perform sampling on the target data is set. Sampling is performed for the specified task period, at the specified time, or when a trace sampling instruction is executed.
		Setting triggers	To perform a triggered trace, you set a condition to trigger sampling. A suitable trigger condition is set to record data before and after an event.
		Setting a continuous trace	The method to save the data traced during a continuous trace is set.
		Setting variables to sample	The variables to store in trace memory are registered. The sampling intervals can also be set.
		Starting and stopping tracing	The data trace settings are transferred to the Controller and the tracing starts. If you selected *Trigger (Single)* as the trace type, tracing waits for the trigger to begin sampling. If you selected Continuous, sampling begins immediately and all traced data is transferred to the computer as it is gathered and saved to a file.
		Displaying trace results	You view the results of the traced data in either a chart or in 3D Motion Trace Display Mode. After sampling begins, sample data is immediately transferred and drawn on the graph. The trace target variable table shows the maximum, minimum, and average values for each variable.
		Exporting trace results	Trace results are saved within your project automatically when you save the project on the Sysmac Studio. If you want to save this data as a separate file, you can export the data to a CSV file.
		Printing trace results	You can print out data trace settings along with digital and analog charts.

Category			Function
Simulation	Programs for debugging		You can create programs for debugging that are used only to execute simulations and specify virtual inputs for simulation.
	Executing a simulation	Selecting what to simulate	You can select the programs to simulate from all of the programs in the Sysmac Studio. Programs can be dragged to select them.
		Setting breakpoints	You can set breakpoints to stop the simulation in the Program Editor.
		Executing and stopping simulations	You can control simulation execution to monitor the user program or to check operation through data tracing. Step execution and pausing are also possible.
		Changing the simulation speed	You can change the execution speed.
		Task period simulation	You can display the task periods.
	Setting the virtual equipment	Creating 3D device models	You can create a 3D device model at the control target to monitor with the 3D motion trace function.
		Displaying 3D motion traces	You set the axis variables for each element of the 3D device model, and then set the 3D device into motion according to those axis motions.
		Displaying 2D paths	You can display the 2D paths of the markers for the projections in the 3D display.
Monitoring Information	Displaying unit production information		You can display the production information of the Controller and Special Units, including the models of the Units and unit versions.
	Monitoring task execution times		You can monitor the execution time of each task when the user program is executed on a Controller or in the Simulator. When you are connected to the Simulator, you can also monitor the real processing time of tasks. This allows you to perform a Controller performance test.
	Troubleshooting		You can use troubleshooting to check the errors that occurred in the Controller, display corrections for the errors, and clear the errors.
		Controller errors	Any current Controller errors are displayed. (Observations and information are not displayed.)
		User-defined errors	Information is displayed on current errors.
		Controller event log	You can display a log of Controller events (including Controller errors and Controller information). (You cannot display logs from EtherCAT slaves.)
		User-defined event log	The log of user-defined events that were stored for the Create User-defined Error (SetAlarm) instruction and the Create User-defined Information (SetInfo) instruction is displayed.
		Event Settings Table	The Event Setting Table is used to register the contents displayed on the Sysmac Studio and on HMIs for userdefined events that occur for execution of the Create Userdefined Error (SetAlarm) instruction and the Create Userdefined Information (SetInfo) instruction.
	User memory usage monitor		The space that is used by the project file you are editing in the Sysmac Studio is displayed in relation to the size of the Controller's memory. The file cannot be transferred to the Controller if the files size exceeds the available space.
	Setting clock information		You can read and set the Controller's clock. The computer's clock information is also displayed.
Communications	Going online with a Controller		An online connection is established with the Controller.
	Checking for forced refreshing		When you go offline, any forced refreshing is cleared.
Maintenance	Changing the operating mode of the Controller		There are two operating modes for NJ-series Controllers, depending on if control programs are executed or not. These are RUN mode and PROGRAM mode.
	Resetting the Controller		The operations and status when the power supply to the Controller is cycled are emulated. This can be performed only in PROGRAM mode. You cannot reset the Controller in RUN mode.
	Backing up variables and memory		When you replace an NJ-series Controller, you can back up the retained memory in the Controller to a file and restore the backed up data from the file to the new Controller.
Security Measures	Prevention of incorrect connections	Confirming Controller names and serial IDs	If the name or the serial ID is different between the project and the Controller when an online connection is established, a confirmation dialog box is displayed.
	Prevention of incorrect operation	Operation authority verification	Two levels of operation authority, Administrator and Maintainer, are set for access to the NJ-series CPU Unit to restrict the operations that can be performed.
		Controller write protection	You can prevent rewriting of data in the Controller from the Sysmac Studio.
	Prevention of the theft of assets	Authentication of user program execution IDs	You can ensure that a user program cannot be operated on another CPU Unit even if copied.
		User program transfer with no restoration information	The program source code is not transferred. If this option is selected, programs are not displayed even if uploaded from another computer. However, variables and settings are transferred even if this option is selected.
		Password protection for project files (.smc)	When you export a project file, you can place a password on the file to protect your assets.
Online Help	Sysmac Studio help system		You can access Sysmac Studio operating procedures.
	Instructions reference		Information is provided on how to use the instructions that are supported by the NJ-series CPU Units.
	System-defined variable reference		You can display a list of descriptions of the system-defined variables that you can use on the Sysmac Studio.
	Keyboard mapping reference		You can display a list of convenient shortcut keys that you can use on the Sysmac Studio.

Applicable Models

Series		Unit version	Model
CPU	**NJ-series**	–	NJ501-1300/1400/1500
Servo Drives	**G5-Series**	Unit version 2.1 or higher recommended	R88D-KNA5L-ECT/KN01L-ECT/KN02L-ECT/KN04L-ECT R88D-KN01H-ECT/KN02H-ECT/KN04H-ECT/KN08H-ECT/KN10H-ECT/KN15H-ECT/ KN20H-ECT/KN30H-ECT/KN50H-ECT/KN75H-ECT/KN150H-ECT R88D-KN06F-ECT/KN10F-ECT/KN15F-ECT/KN20F-ECT/KN30F-ECT/KN50F-ECT/ KN75F-ECT/KN150F-ECT
Inverters	**MX2-Series**	Version 1.1 or higher *	3G3MX2-A2001/A2002/A2004/A2007/A2015/A2022/A2037/A2055/A2075/A2110/A2150 3G3MX2-A4004/A4007/A4015/A4022/A4030/A4040/A4055/A4075/A4110/A4150 3G3MX2-AB001/AB002/AB004/AB007/AB015/AB022
Remote I/O Terminals	**GX-series**	Unit version 1.1 or higher recommended	GX-ID1611/1612/1621/1622/1618/1628/3218/3228 GX-OD1611/1612/1621/1622/1618/1628/3218/3228 GX-MD1611/1612/1621/1622/1618/1628/3218/3228 GX-OC1601 GX-AD0471 GX-DA0271 GX-EC0211/0241
HMIs	**NS-series**	NS system program version 8.5 or higher CX-Designer version 3.3 or higher	NS5-MQ11-V2/MQ11B-V2 NS5-SQ11-V2/SQ11B-V2 NS5-TQ11-V2/TQ11B-V2 NS8-TV01-V2/TV01B-V2 NS10-TV01-V2/TV01B-V2 NS12-TS01-V2/TS01B-V2 NS15-TX01S-V2/TX01B-V2
Vision Sensors	**FQ-series**	–	FQ-MS120-ECT/125-ECT FQ-MS120-M-ECT/125-M-ECT

* A communications unit for connecting to EtherCAT network (3G3AX-MX2-ECT with unit version 1.1 or higher) is additionally required.

System Configuration

Controllers

- Machine Automation Controller
  NJ-Series

Automation Software

- Sysmac Studio

EtherCAT Cables

Use a category 5 or higher cable with double, aluminium tape and braided shielding.

Servo Drive

USB Communications

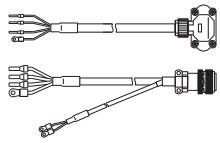
EtherCAT Communications

- G5-Series
  Drives with Built-in
  EtherCAT Communications
  R88D-KN□□-ECT

I/O signals

Power Cables

- Non-Flexible Cables
  - Without Brake
    R88A-CA□□□□□S
  - With Brake
    R88A-CA□□□□□B
- Flexible Cables
  - Without Brake
    R88A-CA□□□□□SR(-E)
  - With Brake
    R88A-CA□□□□□BR(-E)



Brake Cables

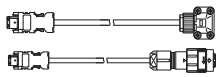
- Non-Flexible Cables
  R88A-CAKA□□□B [≤750W]
  R88A-CAGE□□□B [≥6.0kW]
- Flexible Cables
  R88A-CAKA□□□B(E) [≤750W]
  R88A-CAGE□□□BR-E [≥6.0kW]

Motor power signals

Feedback Signals

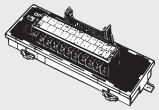
Encoder Cables

- Non-Flexible Cables
  - For 750W or less
    R88A-CRK□□□□C
  - For 1.0kW or more
    R88A-CRKC□□□N
- Flexible Cables
  - For 750W or less
    R88A-CRK□□□□CR
  - For 1.0kW or more
    R88A-CRKC□□□NR



Connector-Terminal Block Conversion Units and Cable

- Connector-Terminal Block Conversion Unit
  XW2□-20G□



- Cable
  XW2Z-□□□J-B34

AC Servomotors

- G5-Series motor R88M-K

3000r/min
2000r/min
1500r/min
1000r/min

INC ABS INC

Peripheral Devices

External scale

- Reactors
  3G3AX-DL
  3G3AX-AL
- External Regeneration Resistors
  R88A-RR

Absolute Encoder Battery Cable

R88A-CRGD0R3C (-BS)
(One Battery is included with model numbers ending in"BS")

Note: Not required if a battery is connected to the control connector (CN1).

Decelerators

INC Incremental output: When the controller power supply is turned ON, operation is always started from the origin.

ABS INC Absolute/Incremental output: The Servomotor can be switched between an absolute output and an Incremental output. When an absolute output is selected and the Controller power supply is turned ON, the Controller reads the Servo absolute position data to restore the absolute position.

R88D-KN□-ECT

G5-series provides both high-speed and highly-accurate control and safety

- High-accuracy positioning with fully-closed control.
- Servo Drives for 400VAC widens applicable systems and environment, including large-scale equipment and overseas facilities.
- Safe design and Safe Torque Off (STO) function (application pending)
- Vibration can be suppressed in acceleration/deceleration even in low rigidity mechanical systems.

General Specifications

Item			Specifications
Ambient operating temperature and operating humidity			0 to 55°C, 90%RH max. (with no condensation)
Storage ambient temperature and humidity			–20 to 65°C, 90%RH max. (with no condensation)
Operating and storage atmosphere			No corrosive gases
Vibration resistance			10 to 60 Hz and at an acceleration of 5.88 m/s^2 or less (Not to be run continuously at a resonance point)
Insulation resistance			Between power supply terminals/power terminals and FG terminal: 0.5 MΩ min. (at 500 VDC)
Dielectric strength			Between power supply/power line terminals and FG terminal: 1,500 VAC for 1 min at 50/60 Hz
Protective structure			Built into panel
International standard	EC Directives	EMC Directive	EN 55011, EN 61000-6-2, IEC 61800-3
		Low Voltage Directive	EN 61800-5-1
		Machinery Directives	EN954-1 (Category 3), EN ISO 13849-1: 2008 (Category 3) (PLc,d), ISO 13849-1: 2006 (Category 3) (PLc,d), EN61508 (SIL2), EN62061 (SIL2), EN61800-5-2 (STO), IEC61326-3-1 (SIL2)
	UL standards		UL 508C
	CSA standards		CSA22.2 No. 14

Note: 1. The above items reflect individual evaluation testing. The results may differ under compound conditions.

2. Never perform dielectric strength or other megameter tests on the Servo Drive. Failure to follow this guideline may result in damaging the internal elements.

3. Depending on the operating conditions, some Servo Drive parts will require maintenance. For details, refer to G5 Series USER'S MANUAL (Cat.No. I576)

Performance Specifications

Servo Drives with 100 VAC Input Power

for Single-phase input type

Item			R88D-KNA5L-ECT	R88D-KN01L-ECT	R88D-KN02L-ECT	R88D-KN04L-ECT
Continuous output current (rms)			1.2A	1.7A	2.5A	4.6A
Input power supply	Main circuit	Power supply capacity	0.4KVA	0.4KVA	0.5KVA	0.9KVA
		Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 V) 50/60 Hz			
		Rated current	1.7A	2.6A	4.3A	7.6A
		Heat value*1	11W	16.6W	21W	25W
	Control circuit	Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 V) 50/60 Hz			
		Heat value*1	4W	4W	4W	4W
Weight			Approx. 0.8kg	Approx. 0.8kg	Approx. 1.0kg	Approx. 1.6kg
Maximum applicable motor capacity			50W	100W	200W	400 W
Applicable Servomotor	3,000 r/min Servomotors	INC	K05030H	K10030L	K20030L	K40030L
		ABS	K05030T	K10030S	K20030S	K40030S
	2,000 r/min Servomotors	ABS	-	-	-	-
	1,000 r/min Servomotors	ABS	-	-	-	-

*1 The heat value is given for rated operation.

Servo Drives with 200 VAC Input Power

for Single-phase/Three-phase input type

Item			R88D-KN01H-ECT	R88D-KN02H-ECT	R88D-KN04H-ECT	R88D-KN08H-ECT	R88D-KN10H-ECT	R88D-KN15H-ECT
Continuous output current (rms)			1.2A	1.6A	2.6A	4.1A	5.9A	9.4A
Input power supply	Main circuit	Power supply capacity	0.5KVA	0.5KVA *1	0.9KVA	1.3KVA	1.8KVA	2.3KVA
		Power supply voltage	Single-phase or 3-phase 200 to 240 VAC (170 to 264 V) 50/60 Hz					
		Rated current	1.6/0.9A *1	2.4/1.3A *1	4.1/2.4A *1	6.6/3.6A *1	9.1/5.2A *1	14.2/8.1A *1
		Heat value*2	14.3/13.7W*1	23/19W *1	33/24W *1	30/35.5W *1	57/49W *1	104/93W*1
	Control circuit	Power supply voltage	Single-phase 200 to 240 VAC (170 to 264 V) 50/60 Hz					
		Heat value*2	4W	4W	4W	4W	7W	7W
Weight			Approx. 0.8kg	Approx. 0.8kg	Approx. 1.0kg	Approx. 1.6kg	Approx. 1.8kg	Approx. 1.8kg
Maximum applicable motor capacity			100W	200W	400W	750W	1kW	1.5kW
Applicable Servomotor	3,000 r/min Servomotors	INC	K05030H K10030H	K20030H	K40030H	K75030H	-	K1K030H K1K530H
		ABS	K05030T K10030T	K20030T	K40030T	K75030T	-	K1K030T K1K530T
	2,000 r/min Servomotors	INC	-	-	-	-	K1K020H	K1K520H
		ABS	-	-	-	-	K1K020T	K1K520T
	1,000 r/min Servomotors	INC	-	-	-	-	-	K90010H
		ABS	-	-	-	-	-	K90010T

*1 The first value is for single-phase input power and the second value is for 3-phase input power.
*2 The heat value is given for rated operation.

Servo Drives with 200 VAC Input Power

for Three-phase input type

Item			R88D-KN20H-ECT	R88D-KN30H-ECT	R88D-KN50H-ECT	R88D-KN75H-ECT	R88D-KN150H-ECT
Continuous output current (rms)			13.4A	18.7A	33.0A	44.0A	66.1A
Input power supply	Main circuit	Power supply capacity	3.3KVA	4.5KVA	7.5KVA	11.0KVA	22.0KVA
		Power supply voltage	3-phase 200 to 230 VAC (170 to 253 V) 50/60 Hz			3-phase 200 to 230VAC (170 to 253V) 50/60Hz 280 to 325VDC (238 to 357V)	
		Rated current	11.8A	15.1A	21.6A	32.0A	58.0A
		Heat value *1	139W	108W	328W	381W	720W
	Control circuit	Power supply voltage	Single-phase 200 to 230 VAC (170 to 253 V) 50/60 Hz			Single-phase 200 to 230VAC (170 to 253V) 50/60Hz 280 to 25VDC (238 to 357V)	
		Heat value *1	10W	13W	13W	15W	17W
Weight			Approx. 2.7kg	Approx. 4.8kg	Approx. 4.8kg	Approx. 13.5kg	Approx. 21.0kg
Maximum applicable motor capacity			2kW	3kW	5kW	7.5kW	15kW
Applicable Servomotor	3,000 r/min Servomotors	INC	K2K030H	K3K030H	K4K030H K5K030H	–	–
		ABS	K2K030T	K3K030T	K4K030T K5K030T	–	–
	2,000 r/min Servomotors	INC	K2K020H	K3K020H	K4K020H K5K020H	–	–
		ABS	K2K020T	K3K020T	K4K020T K5K020T	K7K515T	K11K015T K15K015T
	1,000 r/min Servomotors	INC	–	K2K010H	K3K010H	–	–
		ABS	–	K2K010T	K3K010T K4K510T	K6K010T	–

*1 The heat value is given for rated operation.

Servo Drives with 400 VAC Input Power

for Three-phase input type

Item			R88D-KN06F-ECT	R88D-KN10F-ECT	R88D-KN15F-ECT	R88D-KN20F-ECT	R88D-KN30F-ECT	R88D-KN50F-ECT	R88D-KN75F-ECT	R88D-KN150F-ECT
Continuous output current (rms)			1.5A	2.9A	4.7A	6.7A	9.4A	16.5A	22.0A	33.1A
Input power supply	Main circuit	Power supply capacity	1.2KVA	1.8KVA	2.3KVA	3.8KVA	4.5KVA	6.0KVA	11.0KVA	22.0KVA
		Power supply voltage	Three-phase 380 to 480 VAC (323 to 528 V) 50/60 Hz							
		Rated current	2.1A	2.8A	4.7A	5.9A	7.6A	12.1A	16.0A	29.0A
		Heat value*1	32.2W	48W	49W	65W	108W	200W	300W	590W
	Control circuit	Power supply voltage	24 VDC (20.4 to 27.6 V)							
		Heat value*1	7W	7W	7W	10W	13W	13W	15W	22W
Weight			Approx. 1.9kg	Approx. 1.9kg	Approx. 1.9kg	Approx. 2.7kg	Approx. 4.7kg	Approx. 4.7kg	Approx. 13.5kg	Approx. 21.0kg
Maximum applicable motor capacity			600W	1kW	1.5kW	2kW	3kW	5kW	7.5kW	15kW
Applicable Servomotor	3,000 r/min Servomotors	INC	–	K75030F	K1K030F K1K530F	K2K030F	K3K030F	K4K030F K5K030F	–	–
		ABS	–	K75030C	K1K030C K1K530C	K2K030C	K3K030C	K4K030C K5K030C	–	–
	2,000 r/min Servomotors	INC	K40020F K60020F	K1K020F	K1K520F	K2K020F	K3K020F	K4K020F K5K020F	–	–
		ABS	K40020C K60020C	K1K020C	K1K520C	K2K020C	K3K020C	K4K020C K5K020C	K7K515C	K11K015C K15K015C
	1,000 r/min Servomotors	INC	–	–	K90010F	–	K2K010F	K3K010F	–	–
		ABS	–	–	K90010C	–	K2K010C	K3K010C K4K510C	K6K010C	–

*1 The heat value is given for rated operation.

EtherCAT Communications Specifications

Item	Specification
Communications standard	IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 × 2 (shielded) ECAT IN: EtherCAT input ECAT OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization in DC mode. DC cycle: 250 μs, 500 μs, 1 ms, 2 ms, 4 ms
LED indicators	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
CiA402 Drive Profile	• Cyclic synchronous position mode • Cyclic synchronous velocity mode • Cyclic synchronous torque mode • Profile position mode • Homing mode • Touch probe function (Latch function) • Torque limit function

Version Information

Unit Versions

Unit	Model	Unit version		
		Unit version 1.0	**Unit version 2.0**	**Unit version 2.1**
AC Servo Drives G5-Series built-in EtherCAT Communications	**R88D-KN□-ECT-R**	Supported	Not supported	Not supported
	R88D-KN□-ECT	Not supported	Supported	Supported
Compatible Sysmac Studio version		Version 1.00 or higher *1	Version1.00 or higher *2	Version1.00 or higher

*1 The function that was enhanced by the upgrade for Unit version2.0 can not be used. For detail, refer to "Function Support by Unit Version".
*2 The function that was enhanced by the upgrade for Unit version2.1 can not be used. For detail, refer to "Function Support by Unit Version".

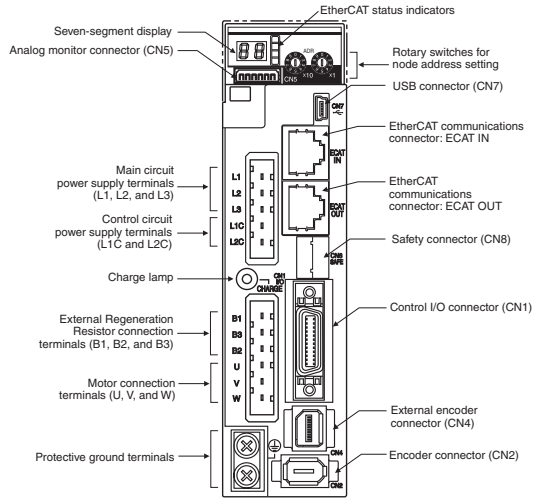
Function Support by Unit Version

Unit		AC Servo Drives G5-Series built-in EtherCAT Communications		
Model		R88D-KN□-ECT-R	R88D-KN□-ECT	
Item \ Unit version		Unit version 1.0	Unit version 2.0	Unit version 2.1
Sysmac Products Features	**Sysmac Error Status**	No supported		Supported
	Saving the Node Address Setting	No supported		Supported
	Serial Number Display *1	No supported		Supported
	ESI Specification (Version 1.0)	No supported		Supported
	SII Data Check	No supported		Supported
Fixed PDO mapping		No supported	Supported	
Variable PDO mapping (1600 hex, 1A00 hex)		No supported		Supported
Available operation modes	**csp: Cyclic synchronous position mode**	Supported		
	csv: Cyclic synchronous velocity mode	No supported	Supported	
	cst: Cyclic synchronous torque mode	No supported	Supported	
	pp: Profile position mode	No supported		Supported
	hm: Homing mode	No supported	Supported	
FIR filter function		No supported	Supported *2 (Available when the communications cycle is 1 ms or above)	
Error detection function	**Excessive Speed Deviation Error**	No supported	Supported	
	Interruptions Error	No supported	Supported	
Electronic gear function		Supported	No supported (only to 1:1)	Supported
Fully-closed Control *3		Supported	Available when the communications cycle is 500･s or above in csp and 1 ms or above in hm.	Available when the communications cycle is 1 ms or above at an electronic gear ratio of 1:1 and 2 ms or above at a gear ratio other than 1:1. *4

Unit	AC Servo Drives G5-Series built-in EtherCAT Communications		
Model	R88D-KN□-ECT-R	R88D-KN□-ECT	
Item \ Unit version	Unit version 1.0	Unit version 2.0	Unit version 2.1
Torque limit objects	PDO mapping to 60E0/ 60E1 hex is not possible.	PDO mapping to 60E0/60E1 hex is possible.*5	
Positioning Completion Range	No supported		Supported
Reference Position for CSP (4020 hex)	No supported		Supported
Data Setting Warning Detection Setting (3781)	No supported		Supported
Version indication on the unit label	No supported	Supported	

*1 The function to show the serial number controlled by OMRON in 1018h-04 hex.
*2 Setting the communications cycle to 500 μs or less does not enable the FIR filter function, although doing so does not cause any error.
*3 If Fully-closed Control is not available, a Function Setting Error (Error No. 93.4) will occur.
*4 This is applicable only when the total size of the objects mapped to RxPDO is 12 bytes or less. For details, refer to the USER'S MANUAL.
*5 There are objects added (3013 hex/3522 hex) to or renamed (3525 hex/3526 hex) from unit version 1.0.
For details of these objects, refer to Torque Limit Selection (3521 hex) in Extended Objects of each manual.

Components and Functions

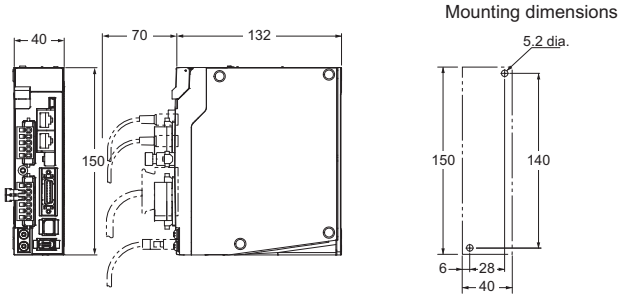

EtherCAT status indicators
Seven-segment display
Analog monitor connector (CN5)
Rotary switches for node address setting
USB connector (CN7)
EtherCAT communications connector: ECAT IN
Main circuit power supply terminals (L1, L2, and L3)
EtherCAT communications connector: ECAT OUT
Control circuit power supply terminals (L1C and L2C)
Safety connector (CN8)
Charge lamp
Control I/O connector (CN1)
External Regeneration Resistor connection terminals (B1, B2, and B3)
Motor connection terminals (U, V, and W)
External encoder connector (CN4)
Protective ground terminals
Encoder connector (CN2)

Name	Function
Display	A 2-digit 7-segment display shows the node address, error codes, and other Servo Drive status.
Charge Lamp	Lights when the main circuit power supply is turned ON.
EtherCAT Status Indicators	These indicators show the status of EtherCAT communications. For details, refer to G5 Series USER'S MANUAL (Cat.No. I576).
Control I/O Connector (CN1)	Used for command input signals and I/O signals.
Encoder Connector (CN2)	Connector for the encoder installed in the Servomotor.
External Encoder Connector (CN4)	Connector for an encoder signal used during fully-closed control.
EtherCAT Communications Connectors (ECAT IN and ECAT OUT)	These connectors are for EtherCAT communications.
Analog Monitor Connector (CN5)	You can use a special cable to monitor values, such as the motor rotation speed, torque command value, etc.
USB Connector (CN7)	Communications connector for the computer.
Safety Connector (CN8)	Connector for safety devices. If no safety devices are used, keep the factory-set safety bypass connector installed.

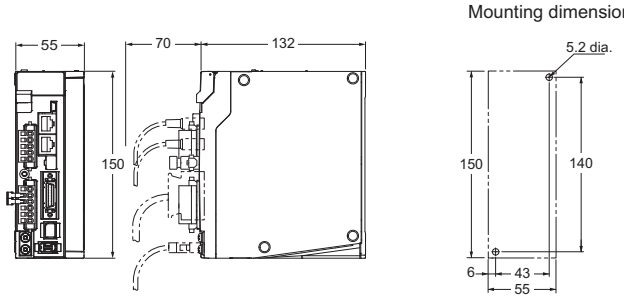
Dimensions

<Wall Mounting>

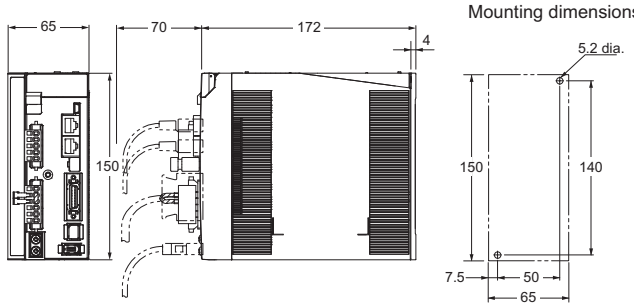
Single-phase 100 VAC R88D-KNA5L-ECT/-KN01L-ECT (50 to 100 W)
Single-phase/Three-phase 200 VAC R88D-KN01H-ECT/-KN02H-ECT (100 to 200W)



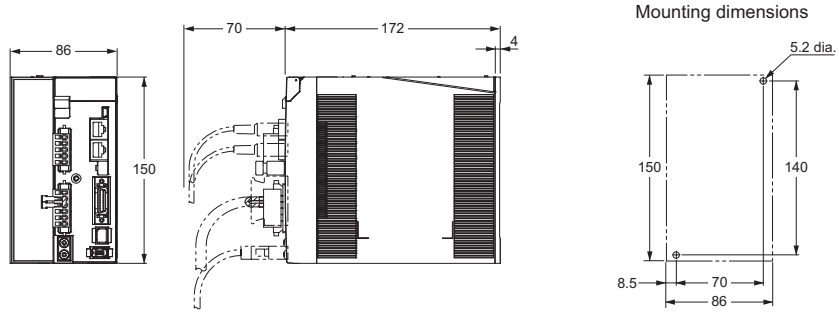
Single-phase 100 VAC R88D-KN02L-ECT (200W)
Single-phase/Three-phase 200 VAC R88D-KN04H-ECT (400W)



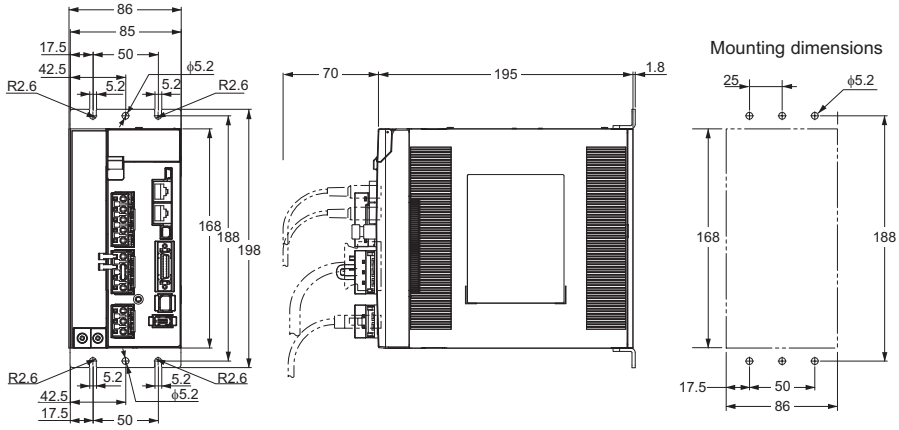
Single-phase 100 VAC R88D-KN04L-ECT (400W)
Single-phase/Three-phase 200 VAC R88D-KN08H-ECT (750W)



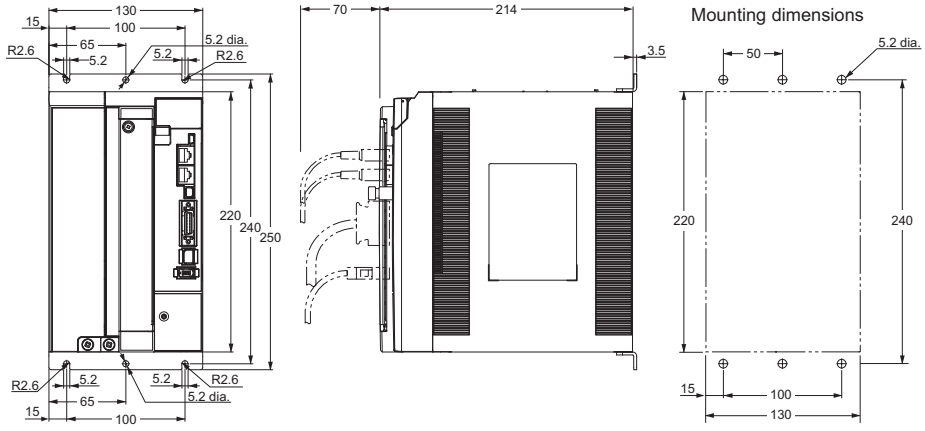
Single-phase/Three-phase 200 VAC R88D-KN10H-ECT/-KN15H-ECT (900W to 1.5kW)



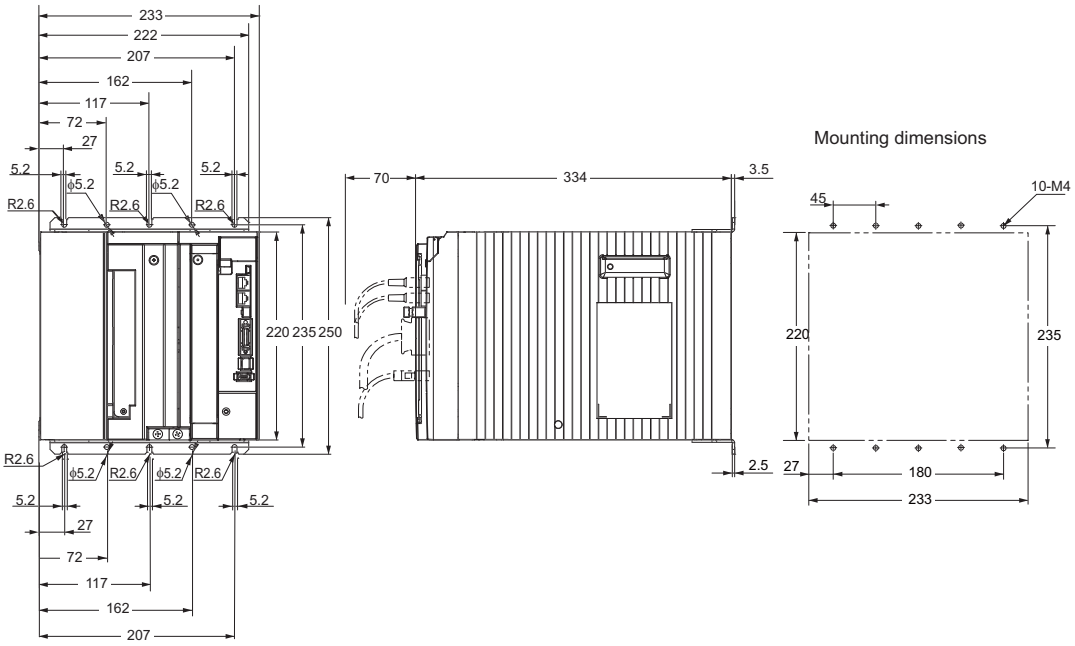
Three-phase 200 VAC R88D-KN20H-ECT (2kW)



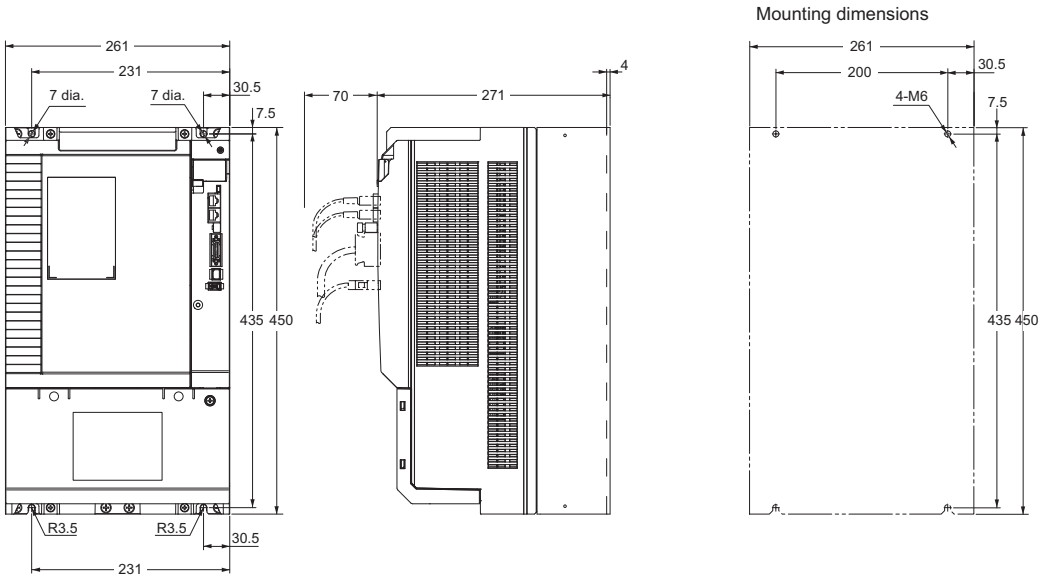
Three-phase 200 VAC R88D-KN30H-ECT/-KN50H-ECT (3 to 5kW)



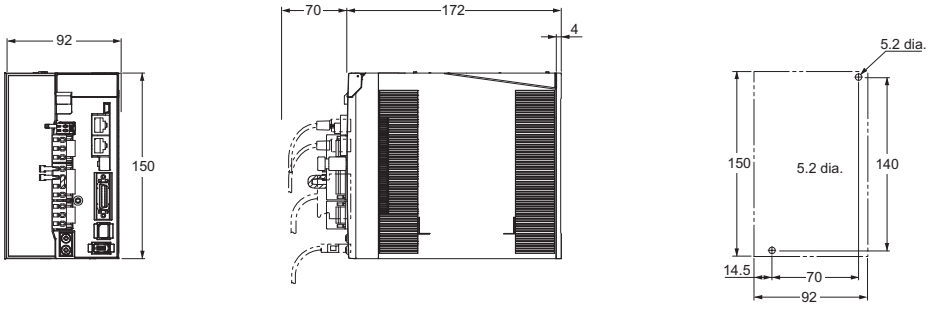
Three-phase 200 VAC R88D-KN75H-ECT (7.5kW)



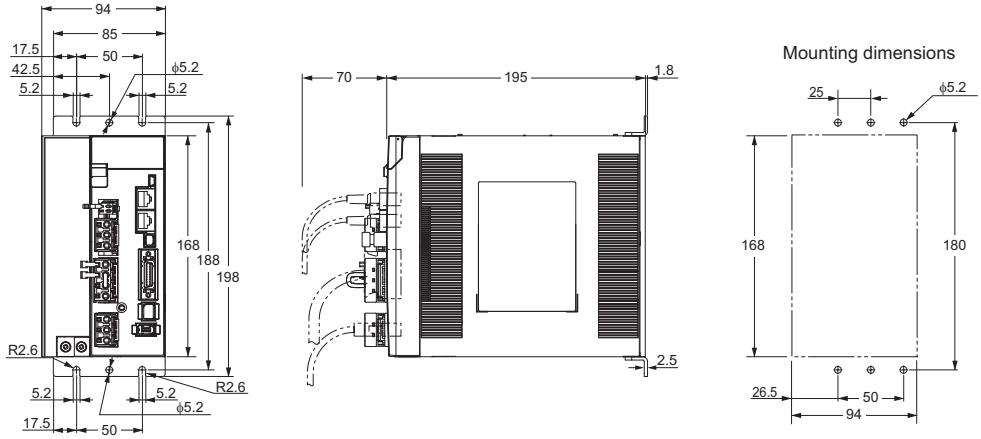
Three-phase 200 VAC R88D-KN150H-ECT (15kW)



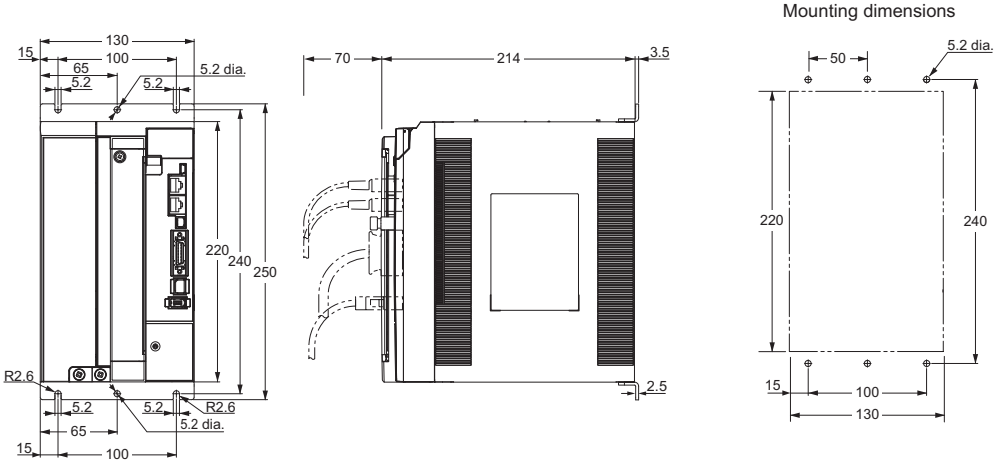
Three-phase 400 VAC R88D-KN06F-ECT/-KN10F-ECT (600W to 1.0kW)
Three-phase 400 VAC R88D-KN15F-ECT (1.5kW)



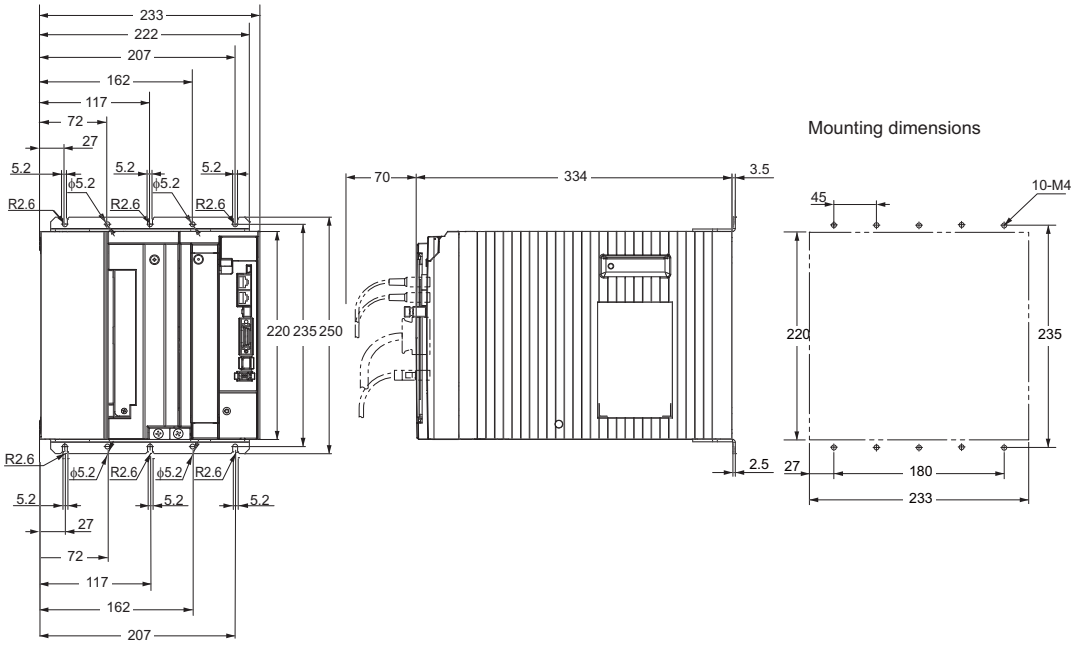
Three-phase 400 VAC R88D-KN20F-ECT (2kW)



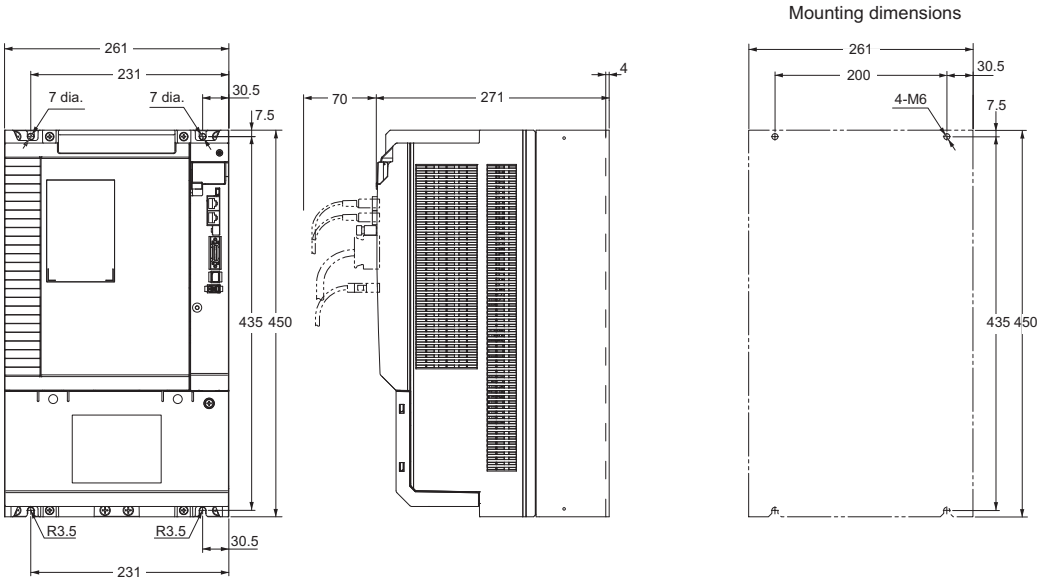
Three-phase 400 VAC R88D-KN30F-ECT/-KN50F-ECT (3 to 5kW)



Three-phase 400 VAC R88D-KN75F-ECT (7.5kW)



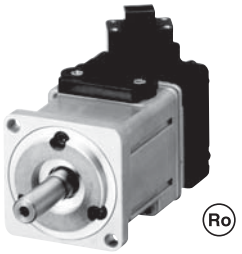
Three-phase 400 VAC R88D-KN150F-ECT (15kW)



R88M-K INC ABS/INC

Servo family for accurate motion control. Power range extended up to 15kW

- Maximum rotation speed : 6,000 r/min
- Featuring a 20-bit high-resolution incremental encoder
- Servomotors Conform to IP67
- 60% cogging torque reduction



General Specifications

Item			3,000-r/min motors		1,000-r/min motors 1,500-r/min motors 2,000-r/min motors
			50 to 750W	1 to 5kW	900W to 15kW
Ambient operating temperature and operating humidity			0 to 40°C 20 to 85% RH (with no condensation)		
Storage ambient temperature and humidity			–20 to +65°C, 20% to 85% RH (with no condensation) Guaranteed maximum temperature: 72 hours at 80°C		
Operating and storage atmosphere			No corrosive gases		
Vibration resistance *1			Acceleration of 49 m/s^2 24.5 m/s^2 max. in X, Y, and Z directions when the motor is stopped		
Impact resistance			Acceleration of 98 m/s^2 max. 3 times each in X, Y, and Z directions		
Insulation resistance			Between power terminal and FG terminal: 20 MΩ min. (at 500 VDC Megger)		
Dielectric strength			1,500 VAC between power terminal and FG terminal (sensed current 10 mA) for 1 min (voltage 100 V, 200 V) 1,800 VAC between power terminal and FG terminal (sensed current 10 mA) for 1 min (voltage 400 V) 1,000 VAC between brake terminal and FG terminal (sensed current 10 mA) for 1 min		
Insulation class			Type B	Type F	
Protective structure			IP67 (except for through-shaft parts and motor and encoder connector pins)		
International standard	EC directive	EMC directive	EN55011 classA group1		
			EN61000-6-2, IEC61800-3, IEC61326-3-1		
		Low voltage directive	EN60034-1/-5		
	UL standards		UL1004-1		UL1004-1,UL1004-6 *2
	CSA standards		CSA 22.2 No.100		

*1 The amplitude may be amplified by machine resonance. Do not exceed 80% of the specified value for extended periods of time.
*2 UL 1004-6 applies only to 1,500-r/min Servomotors of 7.5 to 15 kW and 1,000-r/min Servomotors of 4.5 to 6 kW.

Note: 1. Do not use the cable when it is laying in oil or water.
2. Do not expose the cable outlet or connections to stress due to bending or the weight of the cable itself.

Performance Specifications

<Cylinder type>

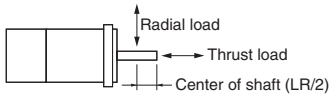
• 3,000 r/min Servomotors (100 VAC Input Power)

Item		Unit	Model (R88M-) K05030H / K05030T	K10030L / K10030S	K20030L / K20030S	K40030L / K40030S
Rated output *1		W	50	100	200	400
Rated torque *1		N • m	0.16	0.32	0.64	1.3
Rated rotation speed		r/min	3,000			
Momentary maximum rotation speed		r/min	6,000			
Momentary maximum torque*1		N • m	0.48	0.95	1.91	3.8
Rated current *1		A (rms)	1.1	1.6	2.5	4.6
Momentary maximum current*1		A (rms)	4.7	6.9	10.6	19.5
Rotor inertia	Without brake	kg • m²	0.025×10^{-4}	0.051×10^{-4}	0.14×10^{-4}	0.26×10^{-4}
	With brake	kg • m²	0.027×10^{-4}	0.054×10^{-4}	0.16×10^{-4}	0.28×10^{-4}
Applicable load inertia		–	30 times the rotor inertia max. *2			
Torque constant *1		N • m/A	0.11±10%	0.14±10%	0.20±10%	0.21±10%
Power rate *1	Without brake	kW/s	10.1	19.8	28.9	62.4
	With brake	kW/s	9.4	18.7	25.3	37.8
Mechanical time constant	Without brake	ms	1.43	1.03	0.61	0.48
	With brake	ms	1.54	1.09	0.70	0.52
Electrical time constant		ms	0.82	0.91	3.0	3.4
Allowable radial load *3		N	68	68	245	245
Allowable thrust load *3		N	58	58	98	98
Weight	Without brake	kg	Approx. 0.31	Approx. 0.45	Approx. 0.78	Approx. 1.2
	With brake	kg	Approx. 0.51	Approx. 0.65	Approx. 1.2	Approx. 1.6
Radiator plate dimensions (material)			100×80×t10 (Al)		130×120×t12 (Al)	
Applicable drivers (R88D-)			KNA5L-ECT	KN01L-ECT	KN02L-ECT	KN04L-ECT
Brake specifications	Brake inertia	kg • m²	2×10^{-7}	2×10^{-7}	1.8×10^{-6}	1.8×10^{-6}
	Excitation voltage *4	V	24 VDC±10%			
	Power consumption (at 20°C)	W	7	7	9	9
	Current consumption (at 20°C)	A	0.3	0.3	0.36	0.36
	Static friction torque	N • m	0.29 min.	0.29 min.	1.27 min.	1.27 min.
	Attraction time *5	ms	35 max.	35 max.	50 max.	50 max.
	Release time *5	ms	20 max.	20 max.	15 max.	20 max.
	Backlash		±1°			
	Allowable work per braking	J	39.2	39.2	137	137
	Allowable total work	J	4.9×10^{3}	4.9×10^{3}	44.1×10^{3}	44.1×10^{3}
	Allowable angular acceleration	rad/s²	30,000 max. (Speed of 2,800 r/min or more must not be changed in less than 10 ms)			
	Brake limit	–	10 million times min.			
	Rating	–	Continuous			
	Insulation class	–	Type F			

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

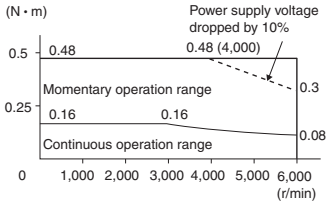
*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

Torque and Rotation Speed Characteristics

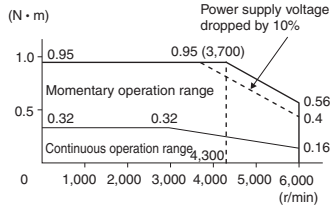
• 3,000 r/min Servomotors (100 VAC Input Power)

The following graphs show the characteristics with a 3-m standard cable and a 100 VAC input.

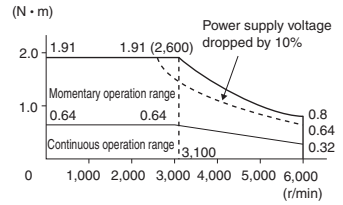
- R88M-K05030H/T (50W)



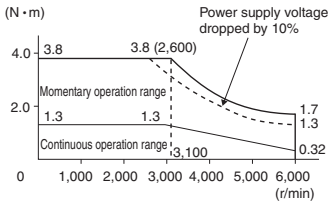
- R88M-K10030L/S (100W)



- R88M-K20030L/S (200W)



- R88M-K40030L/S (400W)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

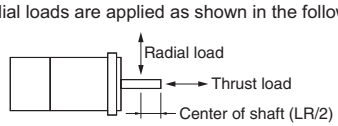
• 3,000 r/min Servomotors (200 VAC Input Power)

Item		Unit	Model (R88M-) K05030H / K05030T	K10030H / K10030T	K20030H / K20030T	K40030H / K40030T	K75030H / K75030T	K1K030H / K1K030T	K1K530H / K1K530T	K2K030H / K2K030T	K3K030H / K3K030T	K4K030H / K4K030T	K5K030H / K5K030T
Rated output *1		W	50	100	200	400	750	1000	1500	2000	3000	4000	5000
Rated torque *1		N • m	0.16	0.32	0.64	1.3	2.4	3.18	4.77	6.37	9.55	12.7	15.9
Rated rotation speed		r/min	3,000										
Momentary maximum rotation speed]		r/min	6,000					5,000				4,500	
Momentary maximum torque *1		N • m	0.48	0.95	1.91	3.8	7.1	9.55	14.3	19.1	28.6	38.2	47.7
Rated current *1		A (rms)	1.1	1.1	1.5	2.4	4.1	6.6	8.2	11.3	18.1	19.6	24.0
Momentary maximum current *1		A (rms)	4.7	4.7	6.5	10.2		28	35	48	77	83	102
Rotor inertia	Without brake	kg • m²	0.025×10^{-4}	0.051×10^{-4}	0.14×10^{-4}	0.26×10^{-4}	0.87×10^{-4}	2.03×10^{-4}	2.84×10^{-4}	3.68×10^{-4}	6.50×10^{-4}	12.9×10^{-4}	17.4×10^{-4}
	With brake	kg • m²	0.027×10^{-4}	0.054×10^{-4}	0.16×10^{-4}	0.28×10^{-4}	0.97×10^{-4}	2.35×10^{-4}	3.17×10^{-4}	4.01×10^{-4}	7.85×10^{-4}	14.2×10^{-4}	18.6×10^{-4}
Applicable load inertia		–	30 times the rotor inertia max. *2				20 times the rotor inertia max. *2	15 times the rotor inertia max. *2		15 times the rotor inertia max. *2			
Torque constant *1		N • m/A	0.11±10%	0.21±10%	0.32±10%	0.40±10%	0.45±10%	0.37	0.45	0.44	0.41	0.49	0.49
Power rate *1	Without brake	kW/s	10.1	19.8	28.9	62.3	65.4	49.8	80.1	110	140	126	146
	With brake	kW/s	9.4	18.7	25.3	57.8	58.7	43.0	71.8	101	116	114	136
Mechanical time constant	Without brake	ms	1.43	1.07	0.58	0.43	0.37	0.61	0.49	0.44	0.41	0.51	0.50
	With brake	ms	1.54	1.13	0.66	0.46	0.42	0.71	0.55	0.48	0.49	0.56	0.54
Electrical time constant		ms	0.82	0.90	3.2	3.4	5.3	5.8	6.3	6.7	11	12	13
Allowable radial load *3		N	68	68	245	245	490	490	490	490	490	784	784
Allowable thrust load *3		N	58	58	98	98	196	196	196	196	196	343	343
Weight	Without brake	kg	Approx. 0.31	Approx. 0.46	Approx. 0.79	Approx. 1.2	Approx. 2.3	Approx. 3.5	Approx. 4.4	Approx. 5.3	Approx. 8.3	Approx. 11.0	Approx. 14.0
	With brake	kg	Approx. 0.51	Approx. 0.66	Approx. 1.2	Approx. 1.6	Approx. 3.1	Approx. 4.5	Approx. 5.4	Approx. 6.3	Approx. 9.4	Approx. 12.6	Approx. 16.0
Radiator plate dimensions (material)			100×80×t10 (Al)		130×120×t12 (Al)		170×160 ×t12 (Al)	320×300×t20 (Al)		380×350×t30 (Al)			
Applicable drives (R88D-)			KN01H-ECT	KN01H-ECT	KN02H-ECT	KN04H-ECT	KN08H-ECT	KN15H-ECT	KN15H-ECT	KN20H-ECT	KN30H-ECT	KN50H-ECT	KN50H-ECT
Brake specifications	Brake inertia	kg • m²	2×10^{-7}	2×10^{-7}	1.8×10^{-6}	1.8×10^{-6}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	1.35×10^{-4}	1.35×10^{-4}
	Excitation voltage *4	V	24 VDC±10%										
	Power consumption (at 20°C)	W	7	7	9	9	17	19	19	19	19	22	22
	Current consumption (at 20°C)	A	0.3	0.3	0.36	0.36	0.70±10%	0.81±10%	0.81±10±	0.81±10%	0.81±10%	0.90±10%	0.90±10%
	Static friction torque	N • m	0.29 min.	0.29 min.	1.27 min.	1.27 min.	2.5 min.	7.8 min.	7.8 min.	7.8 min.	11.8 min.	16.1 min.	16.1 min.
	Attraction time *5	ms	35 max.	35 max.	50 max.	50 max.	50 max.	50 max.	50 max.	50 max.	80 max.	110 max.	110 max.
	Release time *5	ms	20 max.	20 max.	15 max.	15 max.	15 max. *6	15 max. *6	15 max. *6	15 max. *6	15 max. *6	50 max. *7	50 max. *7
	Backlash		±1°										
	Allowable work per braking	J	39.2	39.2	137	137	392	392	392	392	392	1470	1470
	Allowable total work	J	4.9×10^{3}	4.9×10^{3}	44.1×10^{3}	44.1×10^{3}	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	4.9×10^{6}	4.9×10^{6}	2.2×10^{6}	2.2×10^{6}
	Allowable angular acceleration	rad/s²	30,000 max. (Speed of 2,800 r/min or more must not be changed in less than 10 ms)				10,000						
	Brake limit	–	10 million times min.										
	Rating	–	Continuous										
	Insulation class	–	Type F										

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

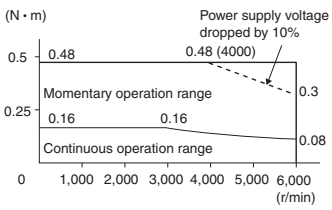
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

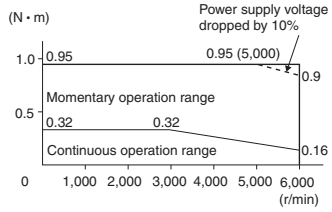
• 3,000 r/min Servomotors (200 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 200 VAC input.

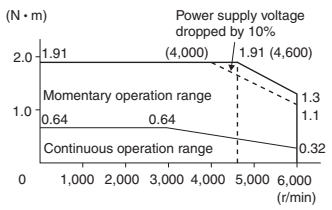
• R88M-K05030H/T (50W)



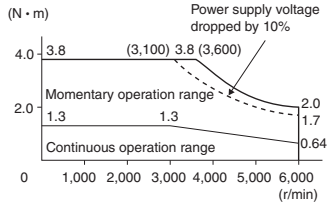
• R88M-K10030H/T (100W)



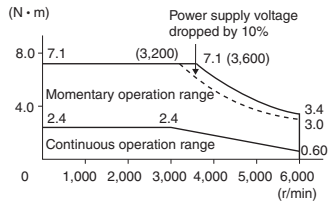
• R88M-K20030H/T (200W)



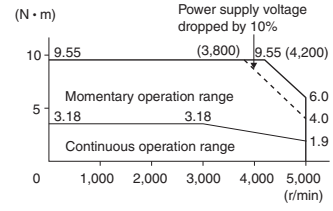
• R88M-K40030H/T (400W)



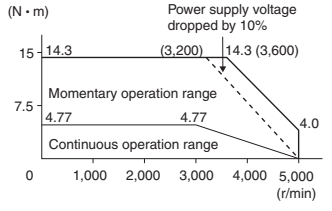
• R88M-K75030H/T (750W)



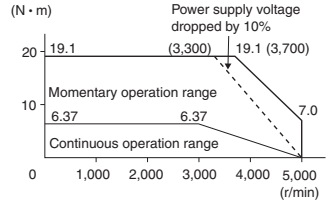
• R88M-K1K030H/T (1kW)



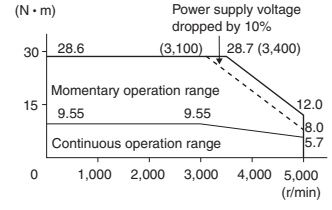
• R88M-K1K530H/T (1.5kW)



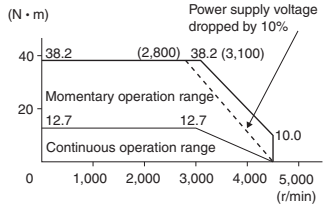
• R88M-K2K030H/T (2kW)



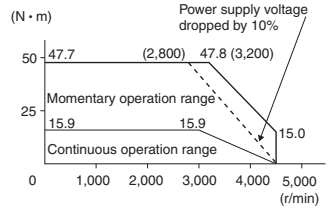
• R88M-K3K030H/T (3kW)



• R88M-K4K030H/T (4kW)



• R88M-K5K030H/T (5kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

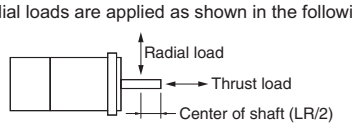
• 3,000 r/min Servomotors (400 VAC Input Power)

Item		Unit	Model (R88M-) K75030F / K75030C	K1K030F / K1K030C	K1K530F / K1K530C	K2K030F / K2K030C	K3K030F / K3K030C	K4K030F / K4K030C	K5K030F / K5K030C
Rated output *1		W	750	1,000	1,500	2,000	3,000	4,000	5,000
Rated torque *1		N • m	2.39	3.18	4.77	6.37	9.55	12.7	15.9
Rated rotation speed		r/min	3,000						
Momentary maximum rotation speed		r/min	5,000					4,500	
Momentary maximum torque*1		N • m	7.16	9.55	14.3	19.1	28.6	38.2	47.7
Rated current *1		A (rms)	2.4	3.3	4.2	5.7	9.2	9.9	12.0
Momentary maximum current *1		A (rms)	10	14	18	24	39	42	51
Rotor inertia	Without brake	kg • m²	1.61×10^{-4}	2.03×10^{-4}	2.84×10^{-4}	3.68×10^{-4}	6.50×10^{-4}	12.9×10^{-4}	17.4×10^{-4}
	With brake	kg • m²	1.93×10^{-4}	2.35×10^{-4}	3.17×10^{-4}	4.01×10^{-4}	7.85×10^{-4}	14.2×10^{-4}	18.6×10^{-4}
Applicable load inertia		–	20 times the rotor inertia max. *2	15 times the rotor inertia max. *2					
Torque constant *1		N • m/A	0.78	0.75	0.89	0.87	0.81	0.98	0.98
Power rate *1	Without brake	kW/s	35.5	49.8	80.1	110	140	126	146
	With brake	kW/s	29.6	43	71.8	101	116	114	136
Mechanical time constant	Without brake	ms	0.67	0.60	0.49	0.45	0.40	0.51	0.50
	With brake	ms	0.8	0.70	0.55	0.49	0.49	0.56	0.54
Electrical time constant		ms	5.9	5.8	6.5	6.6	12	13	13
Allowable radial load *3		N	490	490	490	490	490	784	784
Allowable thrust load *3		N	196	196	196	196	196	343	343
Weight	Without brake	kg	Approx. 3.1	Approx. 3.5	Approx. 4.4	Approx. 5.3	Approx. 8.3	Approx. 11.0	Approx. 14.0
	With brake	kg	Approx. 4.1	Approx. 4.5	Approx. 5.4	Approx. 6.3	Approx. 9.4	Approx. 12.6	Approx. 16.0
Radiator plate dimensions (material)			320×300×t20 (Al)				380×350×t30 (Al)		
Applicable drives (R88D-)			KN10F-ECT	KN15F-ECT	KN15F-ECT	KN20F-ECT	KN30F-ECT	KN50F-ECT	KN50F-ECT
Brake specifications	Brake inertia	kg • m²	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	1.35×10^{-4}
	Excitation voltage *4	V	24 VDC±10%						
	Power consumption (at 20°C)	W	17	19	19	19	19	22	22
	Current consumption (at 20°C)	A	0.70±10%	0.81±10%	0.81±10%	0.81±10%	0.81±10%	0.90±10%	0.90±10%
	Static friction torque	N • m	2.5 min.	7.8 min.	7.8 min.	7.8 min.	11.8 min.	16.1 min.	16.1 min.
	Attraction time *5	ms	50 max.	50 max.	50 max.	50 max.	80 max.	110 max.	110 max.
	Release time *5	ms	15 max. *6	15 max. *6	15 max. *6	15 max. *6	15 max. *6	50 max. *7	50 max. *7
	Backlash		±1°						
	Allowable work per braking	J	392	392	392	392	392	1470	1470
	Allowable total work	J	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	2.2×10^{6}	2.2×10^{6}
	Allowable angular acceleration	rad/s²	10,000						
	Brake limit	–	10 million times min.						
	Rating	–	Continuous						
	Insulation class	–	Type F						

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

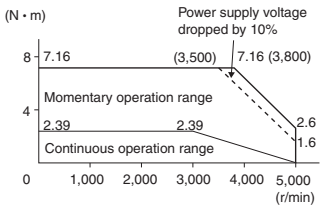
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

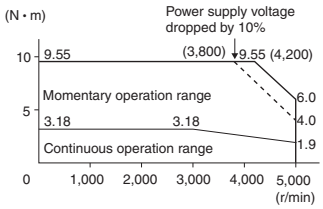
• 3,000 r/min Servomotors (400 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 400 VAC input.

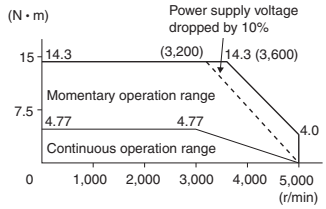
- R88M-K75030F/C (750W)



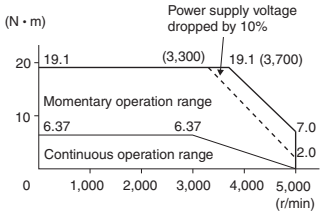
- R88M-K1K030F/C (1kW)



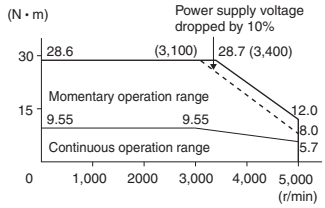
- R88M-K1K530F/C (1.5kW)



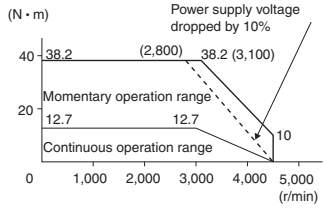
- R88M-K2K030F/C (2kW)



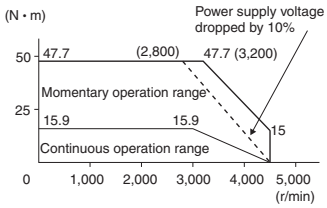
- R88M-K3K030F/C (3kW)



- R88M-K4K030F/C (4kW)



- R88M-K5K030F/C (5kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

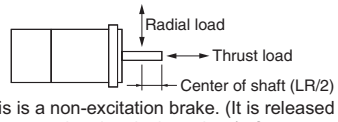
• 1,500r/min, 2,000 r/min Servomotors (200 VAC Input Power)

Item		Unit	Model (R88M-) K1K020H / K1K020T	K1K520H / K1K520T	K2K020H / K2K020T	K3K020H / K3K020T	K4K020H / K4K020T	K5K020H / K5K020T	– / K7K515T	– / K11K015T	– / K15K015T
Rated output *1		W	1,000	1,500	2,000	3,000	4,000	5,000	7,500	11,000	15,000
Rated torque *1		N • m	4.77	7.16	9.55	14.3	19.1	23.9	47.8	70.0	95.0
Rated rotation speed		r/min	2,000						1,500		
Momentary maximum rotation speed		r/min	3,000							2,000	
Momentary maximum torque *1		N • m	14.3	21.5	28.6	43.0	57.3	71.6	119.0	175.0	224.0
Rated current *1		A (rms)	5.7	9.4	11.5	17.4	21.0	25.9	44.0	54.2	66.1
Momentary maximum current *1		A (rms)	24	40	49	74	89	110	165	203	236
Rotor inertia	Without brake	kg • m²	4.60×10^{-4}	6.70×10^{-4}	8.72×10^{-4}	12.9×10^{-4}	37.6×10^{-4}	48.0×10^{-4}	101×10^{-4}	212×10^{-4}	302×10^{-4}
	With brake	kg • m²	5.90×10^{-4}	7.99×10^{-4}	10.0×10^{-4}	14.2×10^{-4}	38.6×10^{-4}	48.8×10^{-4}	107×10^{-4}	220×10^{-4}	311×10^{-4}
Applicable load inertia		–	10 times the rotor inertia max. *2								
Torque constant *1		N • m/A	0.63	0.58	0.64	0.59	0.70	0.70	0.77	0.92	1.05
Power rate *1	Without brake	kW/s	49.5	76.5	105	159	97.1	119	226	231	302
	With brake	kW/s	38.6	64.2	91.2	144	94.5	117	213	223	293
Mechanical time constant	Without brake	ms	0.80	0.66	0.66	0.57	0.65	0.63	0.58	0.80	0.71
	With brake	ms	1.02	0.80	0.76	0.63	0.66	0.64	0.61	0.83	0.74
Electrical time constant		ms	9.4	10	10	12	20	19	21	31	32
Allowable radial load *3		N	490	490	490	784	784	784	1,176	2,254	2,254
Allowable thrust load *3		N	196	196	196	343	343	343	490	686	686
Weight	Without brake	kg	Approx. 5.2	Approx. 6.7	Approx. 8.0	Approx. 11.0	Approx. 15.5	Approx. 18.6	Approx. 36.4	Approx. 52.7	Approx. 70.2
	With brake	kg	Approx. 6.7	Approx. 8.2	Approx. 9.5	Approx. 12.6	Approx. 18.7	Approx. 21.8	Approx. 40.4	Approx. 58.9	Approx. 76.3
Radiator plate dimensions (material)			275×260×t15 (Al)			380×350×t 30 (Al)	470×440×t30 (Al)		550×520×t 30 (Al)	670×630×t35 (Al)	
Applicable drives (R88D-)			KN10H-ECT	KN15H-ECT	KN20H-ECT	KN30H-ECT	KN50H-ECT	KN50H-ECT	KN75H-ECT	KN150H-ECT	KN150H-ECT
Brake specifications	Brake inertia	kg • m²	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	7.1×10^{-4}	7.1×10^{-4}
	Excitation voltage *4	V	24 VDC±10%								
	Power consumption (at 20°C)	W	14	19	19	22	31	31	34	26	26
	Current consumption (at 20°C)	A	0.59±10%	0.79±10%	0.79±10%	0.90±10%	1.3±10%	1.3±10%	1.4±10%	1.08±10%	1.08±10%
	Static friction torque	N • m	4.9 min.	13.7 min.	13.7 min.	16.2 min.	24.5 min.	24.5 min.	58.8 min.	100 min.	100 min.
	Attraction time *5	ms	80 max.	100 max.	100 max.	110 max.	80 max.	80 max.	150 max.	300 max.	300 max.
	Release time *5	ms	70 max. *6	50 max. *6	50 max. *6	50 max. *6	25 max. *7	25 max. *7	50 max.	140 max.	140 max.
	Backlash		±1°								
	Allowable work per braking	J	588	1,176	1,176	1,470	1,372	1,372	1,372	2,000	2,000
	Allowable total work	J	7.8×10^{5}	1.5×10^{6}	1.5×10^{6}	2.2×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	4.0×10^{6}	4.0×10^{6}
	Allowable angular acceleration	rad/s²	10,000						5,000	3,000	
	Brake limit	–	10 million times min.								
	Rating	–	Continuous								
	Insulation class	–	Type F								

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

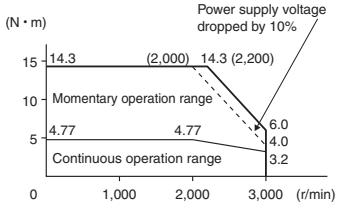
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

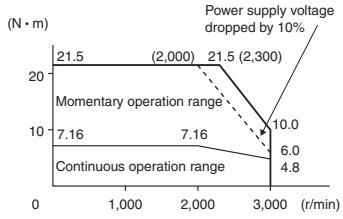
• 1,500r/min, 2,000 r/min Servomotors (200 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 200 VAC input.

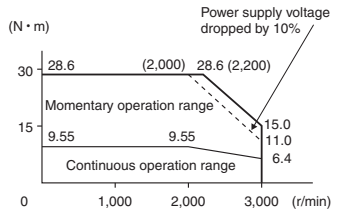
• R88M-K1K020H/T (1kW)



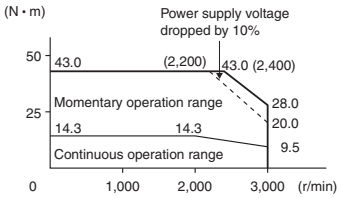
• R88M-K1K520H/T (1.5kW)



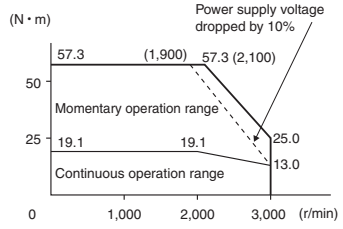
• R88M-K2K020H/T (2kW)



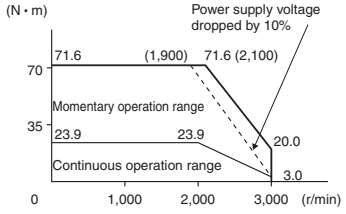
• R88M-K3K020H/T (3kW)



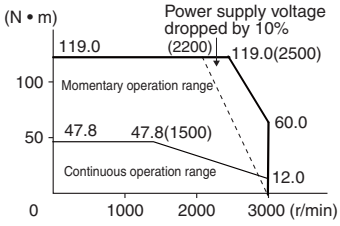
• R88M-K4K020H/T (4kW)



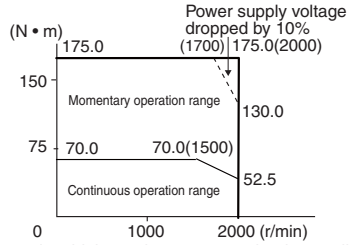
• R88M-K5K020H/T (5kW)



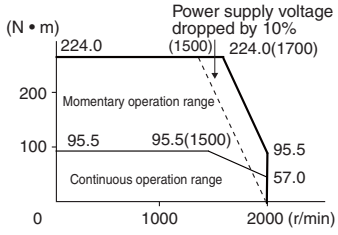
• R88M-K7K515T (7.5kW)



• R88M-K11K015T (11kW)



• R88M-K15K015T (15kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

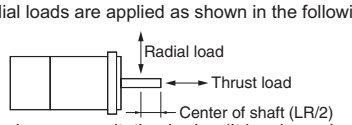
• 1,500r/min, 2,000 r/min Servomotors (400 VAC Input Power)

Item		Model (R88M-)	K40020F	K60020F	K1K020F	K1K520F	K2K020F	K3K020F	K4K020F	K5K020F	–	–	–
		Unit	K40020C	K60020C	K1K020C	K1K520C	K2K020C	K3K020C	K4K020C	K5K020C	K7K515C	K11K015C	K15K015C
Rated output *1		W	400	600	1,000	1,500	2,000	3,000	4,000	5,000	7,500	11,000	15,000
Rated torque *1		N • m	1.91	2.86	4.77	7.16	9.55	14.3	19.1	23.9	47.8	70.0	95.9
Rated rotation speed		r/min	2,000								1,500		
Momentary maximum rotation speed		r/min	3,000									2,000	
Momentary maximum torque *1		N • m	5.73	8.59	14.3	21.5	28.7	43.0	57.3	71.6	119.0	175.0	224.0
Rated current *1		A (rms)	1.2	1.5	2.8	4.7	5.9	8.7	10.6	13.0	22.0	27.1	33.1
Momentary maximum current *1		A (rms)	4.9	6.5	12	20	25	37	45	55	83	101	118
Rotor inertia	Without brake	kg • m²	1.61×10^{-4}	2.03×10^{-4}	4.60×10^{-4}	6.70×10^{-4}	8.72×10^{-4}	12.9×10^{-4}	37.6×10^{-4}	48.0×10^{-4}	101×10^{-4}	212×10^{-4}	302×10^{-4}
	With brake	kg • m²	1.90×10^{-4}	2.35×10^{-4}	5.90×10^{-4}	7.99×10^{-4}	10.0×10^{-4}	14.2×10^{-4}	38.6×10^{-4}	48.8×10^{-4}	107×10^{-4}	220×10^{-4}	311×10^{-4}
Applicable load inertia		–	10 times the rotor inertia max. *2										
Torque constant *1		N • m/A	1.27	1.38	1.27	1.16	1.27	1.18	1.40	1.46	1.54	1.84	2.10
Power rate *1	Without brake	kW/s	22.7	40.3	49.5	76.5	105	159	97.1	119	226	231	302
	With brake	kW/s	19.2	34.8	38.6	64.2	91.2	144	94.5	117	213	223	293
Mechanical time constant	Without brake	ms	0.70	0.62	0.79	0.66	0.68	0.56	0.60	0.60	0.58	0.80	0.71
	With brake	ms	0.83	0.72	1.01	0.79	0.78	0.61	0.61	0.61	0.61	0.83	0.74
Electrical time constant		ms	5.7	5.9	10	10	10	12	21	19	21	31	32
Allowable radial load *3		N	490	490	490	490	490	784	784	784	1,176	2,254	2,254
Allowable thrust load *3		N	196	196	196	196	196	343	343	343	490	686	686
Weight	Without brake	kg	Approx. 3.1	Approx. 3.5	Approx. 5.2	Approx. 6.7	Approx. 8.0	Approx. 11.0	Approx. 15.5	Approx. 18.6	Approx. 36.4	Approx. 52.7	Approx. 70.2
	With brake	kg	Approx. 4.1	Approx. 4.5	Approx. 6.7	Approx. 8.2	Approx. 9.5	Approx. 12.6	Approx. 18.7	Approx. 21.8	Approx. 40.4	Approx. 58.9	Approx. 76.3
Radiator plate dimensions (material)			320×300×t20 (Al)		275×260×t15 (Al)			380×350 ×t30 (Al)	470×440×t30 (Al)		550×520 ×t30 (Al)	670×630×t35 (Al)	
Applicable drives (R88D-)			KN06F-ECT	KN06F-ECT	KN10F-ECT	KN15F-ECT	KN20F-ECT	KN30F-ECT	KN50F-ECT	KN50F-ECT	KN75F-ECT	KN150F-ECT	KN150F-ECT
Brake specifications	Brake inertia	kg • m²	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	7.1×10^{-4}	7.1×10^{-4}
	Excitation voltage *4	V	24 VDC±10%										
	Power consumption (at 20°C)	W	17	17	14	19	19	22	31	31	34	26	26
	Current consumption (at 20°C)	A	0.70±10%	0.70±10%	0.59±10%	0.79±10%	0.79±10%	0.90±10%	1.3±10%	1.3±10%	1.4±10%	1.08±10%	1.08±10%
	Static friction torque	N • m	2.5 min.	2.5 min.	4.9 min.	13.7 min.	13.7 min.	16.2 min.	24.5 min.	24.5 min.	58.8 min.	100 min.	100 min.
	Attraction time *5	ms	50 max.	50 max.	80 max.	100 max.	100 max.	110 max.	80 max.	80 max.	150 max.	300 max.	300 max.
	Release time *5	ms	15 max. *7	15 max. *7	70 max. *6	50 max. *6	50 max. *6	50 max. *6	25 max. *7	25 max. *7	50 max.	140 max.	140 max.
	Backlash		±1°										
	Allowable work per braking	J	392	392	588	1,176	1,176	1,470	1,372	1,372	1,372	2,000	2,000
	Allowable total work	J	4.9×10^{5}	4.9×10^{5}	7.8×10^{5}	1.5×10^{6}	1.5×10^{6}	2.2×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	4.0×10^{6}	4.0×10^{6}
	Allowable angular acceleration	rad/s²	10,000								5,000	3,000	
	Brake limit	–	10 million times min.										
	Rating	–	Continuous										
	Insulation class	–	Type F										

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

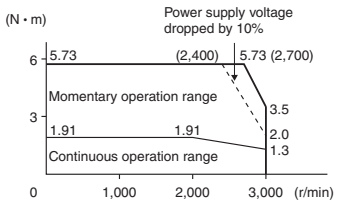
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

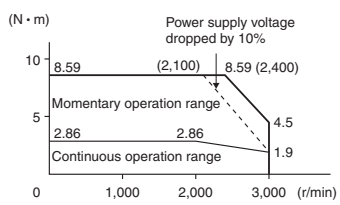
• 1,500r/min, 2,000 r/min Servomotors (400 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 400 VAC input.

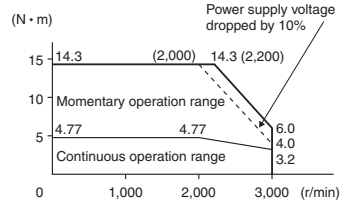
• R88M-K40020F/C (400W)



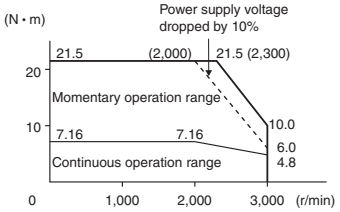
• R88M-K60020F/C (600W)



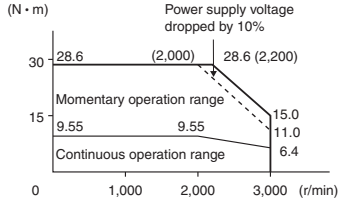
• R88M-K1K020F/C (1kW)



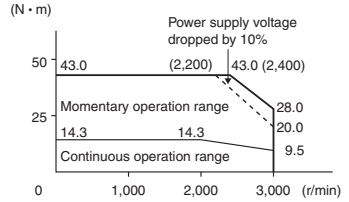
• R88M-K1K520F/C (1.5kW)



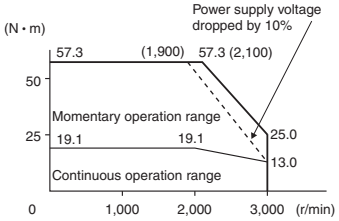
• R88M-K2K020F/C (2kW)



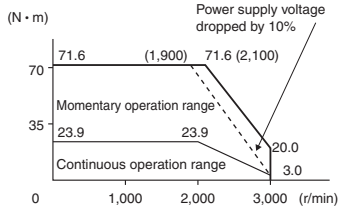
• R88M-K3K020F/C (3kW)



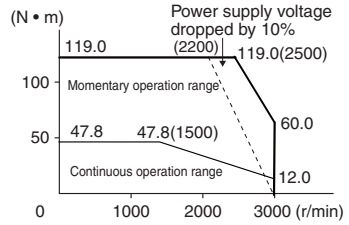
• R88M-K4K020F/C (4kW)



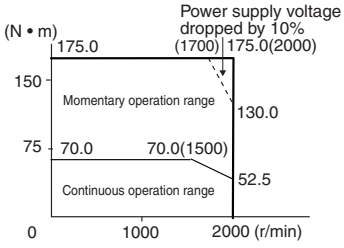
• R88M-K5K020F/C (5kW)



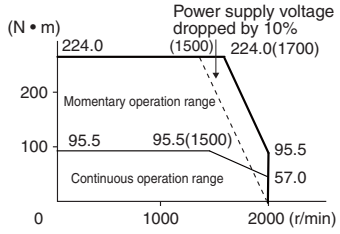
• R88M-K7K515C (7.5kW)



• R88M-K11K015C (11kW)



• R88M-K15K015C (15kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

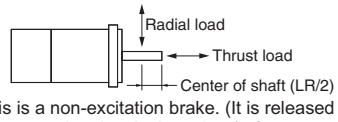
• 1,000 r/min Servomotors (200/400 VAC Input Power)

Item		Unit	200 VAC					400 VAC				
Model (R88M-)			K90010H	K2K010H	K3K010H	–	–	K90010F	K2K010F	K3K010F	–	–
			K90010T	K2K010T	K3K010T	K4K510T	K6K010T	K90010C	K2K010C	K3K010C	K4K510C	K6K010C
Rated output *1		W	900	2,000	3,000	4,500	6,000	900	2,000	3,000	4,500	6,000
Rated torque *1		N • m	8.59	19.1	28.7	43.0	57.0	8.59	19.1	28.7	43.0	57.3
Rated rotation speed		r/min	1,000									
Momentary maximum rotation speed		r/min	2,000									
Momentary maximum torque *1		N • m	19.3	47.7	71.7	107.0	143.0	19.3	47.7	71.7	107.0	143.0
Momentary maximum current *1		A (rms)	7.6	17.0	22.6	29.7	38.8	3.8	8.5	11.3	14.8	19.4
Momentary maximum current *1		A (rms)	24	60	80	110	149	12	30	40	55	74
Rotor inertia	Without brake	kW/s	6.70×10^{-4}	30.3×10^{-4}	48.4×10^{-4}	79.1×10^{-4}	101×10^{-4}	6.70×10^{-4}	30.3×10^{-4}	48.4×10^{-4}	79.1×10^{-4}	101×10^{-4}
	With brake	kW/s	7.99×10^{-4}	31.4×10^{-4}	49.2×10^{-4}	84.4×10^{-4}	107×10^{-4}	7.99×10^{-4}	31.4×10^{-4}	49.2×10^{-4}	84.4×10^{-4}	107×10^{-4}
Applicable load inertia		–	10 times the rotor inertia max. *2									
Torque constant *1		N • m/A	0.86	0.88	0.96	1.02	1.04	1.72	1.76	1.92	2.05	2.08
Power rate *1	Without brake	kW/s	110	120	170	233	325	110	120	170	233	325
	With brake	kW/s	92.4	116	167	219	307	92.4	116	167	219	307
Mechanical time constant	Without brake	ms	0.66	0.75	0.63	0.55	0.54	0.66	0.76	0.61	0.55	0.54
	With brake	ms	0.78	0.78	0.64	0.63	0.57	0.79	0.78	0.62	0.63	0.57
Electrical time constant		ms	11	18	21	20	23	11	18	22	20	23
Allowable radial load *3		N	686	1176	1470	1470	1764	686	1176	1470	1470	1764
Allowable thrust load *3		N	196	490	490	490	588	196	490	490	490	588
Weight	Without brake	kg	Approx. 6.7	Approx. 14.0	Approx. 20.0	Approx. 29.4	Approx. 36.4	Approx. 6.7	Approx. 14.0	Approx. 20.0	Approx. 29.4	Approx. 36.4
	With brake	kg	Approx. 8.2	Approx. 17.5	Approx. 23.5	Approx. 33.3	Approx. 40.4	Approx. 8.2	Approx. 17.5	Approx. 23.5	Approx. 33.3	Approx. 40.4
Radiator plate dimensions (material)			270×260×t15 (Al)			470×440 ×t30 (Al)	550×520 ×t30 (Al)	270×260 ×t15 (Al)	470×440×t30 (Al)			550×520 ×t30 (Al)
Applicable drives (R88D-)			KN15H-ECT	KN30HF-ECT	KN50H-ECT	KN50H-ECT	KN75H-ECT	KN15F-ECT	KN30F-ECT	KN50F-ECT	KN50F-ECT	KN75F-ECT
Brake specifications	Brake inertia	kg • m²	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}
	Excitation voltage *4	V	24 VDC±10%									
	Power consumption (at 20°C)	W	19	31	34	34	34	19	31	34	34	34
	Current consumption (at 20°C)	A	0.79±10%	1.3±10%	1.4±10%	1.4±10%	1.4±10%	0.79±10%	1.3±10%	1.4±10%	1.4±10%	1.4±10%
	Static friction torque	N • m	13.7 min.	24.5 min.	58.8 min.	58.8 min.	58.8 min.	13.7 min.	24.5 min.	58.8 min.	58.8 min.	58.8 min.
	Attraction time *5	ms	100 max.	80 max.	150 max.	150 max.	150 max.	100 max.	80 max.	150 max.	150 max.	150 max.
	Release time *5	ms	50 max. *6	25 max. *7	50 max. *7	50 max.	50 max.	50 max. *6	25 max. *7	50 max. *7	50 max.	50 max.
	Backlash		±1°									
	Allowable work per braking	J	1,176	1,372	1,372	1,372	1,372	1,176	1,372	1,372	1,372	1,372
	Allowable total work	J	1.5×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	1.5×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}
	Allowable angular acceleration	rad/s²	10,000			5,000		10,000			5,000	
	Brake limit	–	10 million times min.									
	Rating	–	Continuous									
	Insulation class	–	Type F									

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

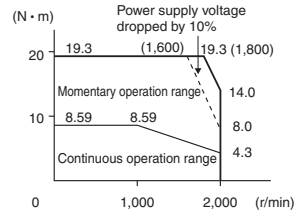
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

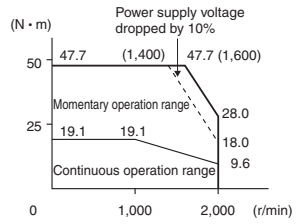
• 1,000 r/min Servomotors (200/400 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 200 VAC input.

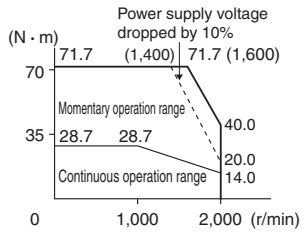
• R88M-K90010H/T/F/C (900W)



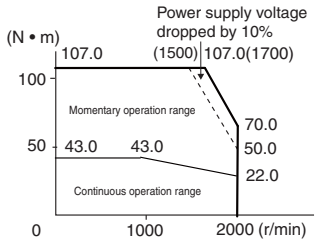
• R88M-K2K010H/T/F/C (2kW)



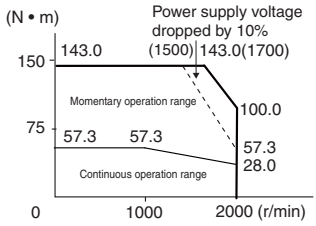
• R88M-K3K010H/T/F/C (3kW)



• R88M-K4K510T/C (4.5kW)



• R88M-K6K010T/C (6kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Encoder Specifications

Incremental Encoders

Item	Specifications
Encoder system	Optical encoder
	20 bits
No. of output pulses	Phases A and B: 262,144 pulses/rotation Phase Z: 1 pulse/rotation
Power supply voltage	5 VDC±5%
Power supply current	180 mA (max.)
Output signals	+S, −S
Output interface	RS-485 compliance

Absolute Encoders

Item	Specifications
Encoder system	Optical encoder
	17 bits
No. of output pulses	Phases A and B: 32,768 pulses/rotation Phase Z: 1 pulse/rotation
Maximum rotations	−32,768 to +32,767 rotations
Power supply voltage	5 VDC±5%
Power supply current	110 mA (max.)
Applicable battery voltage	3.6 VDC
Current consumption of battery	265 μA for a maximum of 5 s right after power interruption 100 μA for operation during power interruption 3.6 μA when power is supplied to Servo Drive
Output signals	+S, −S
Output interface	RS-485 compliance

Note: Multi-rotation Data Backup

- The multi-rotation data will be lost if the battery cable connector is disconnected at the motor when connecting the battery cable for the absolute encoder and battery.
- The multi-rotation data will be lost if CN2 is disconnected when connecting the battery to CN1.

Dimensions

<Cylinder type>

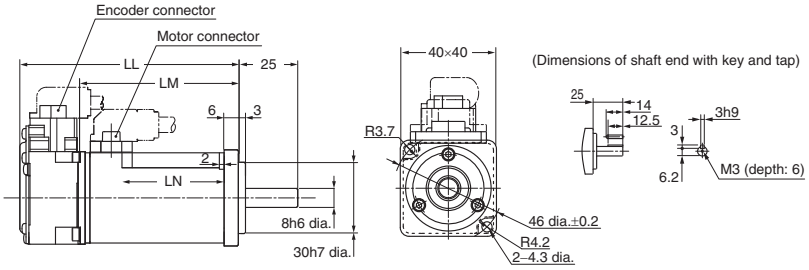
• 3,000 r/min Servomotors (100/200 VAC)

50W/100W

• Without brake

- R88M-K05030H (-S2)/-K10030□ (-S2) **INC**
- R88M-K05030T (-S2)/-K10030□ (-S2) **ABS**

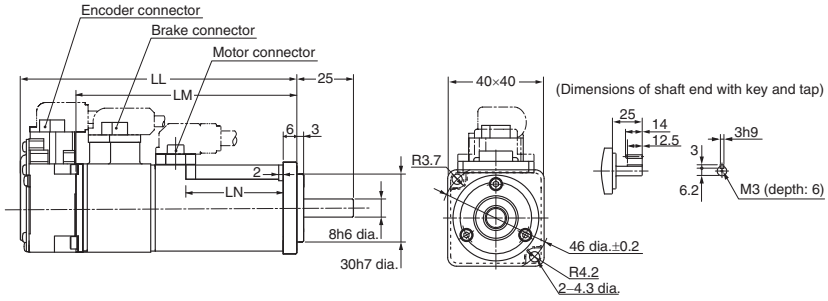
Model	Dimensions (mm)		
	LL	LM	LN
R88M-K05030□	72	48	23
R88M-K10030□	92	68	43



• With brake

- R88M-K05030H-B (S2)/-K10030□-B (S2) **INC**
- R88M-K05030T-B (S2)/-K10030□-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	LN
R88M-K05030□-B□	102	78	23
R88M-K10030□-B□	122	98	43

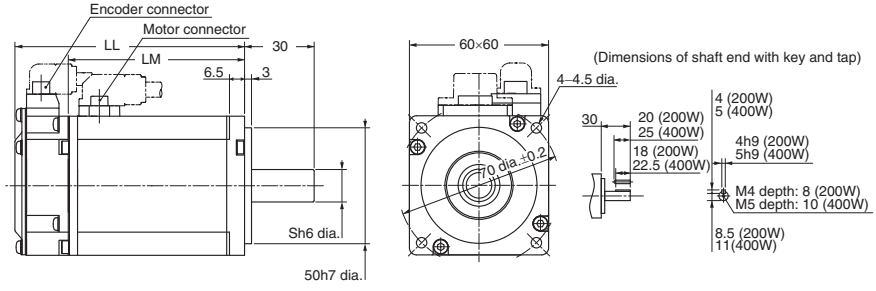


200W/400W

• Without brake

- R88M-K20030□ (-S2)/-K40030□ (-S2) **INC**
- R88M-K20030□ (-S2)/-K40030□ (-S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	LN
R88M-K20030□	79.5	56.5	11
R88M-K40030□	99	76	14

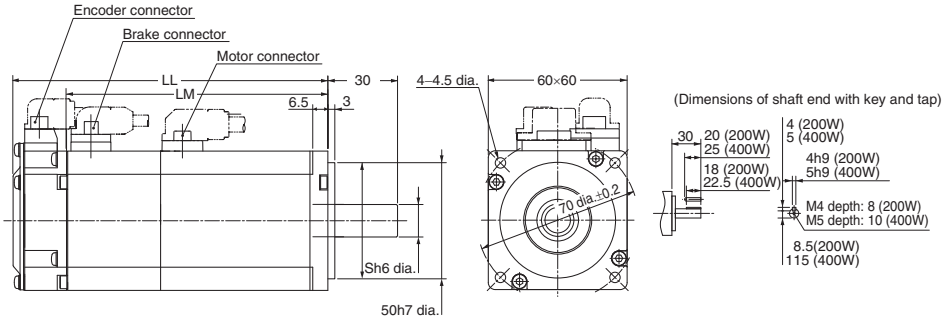


Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• With brake

- R88M-K20030□-B (S2)/-K40030□-B (S2) **INC**
- R88M-K20030□-B (S2)/-K40030□-B (S2) **ABS**

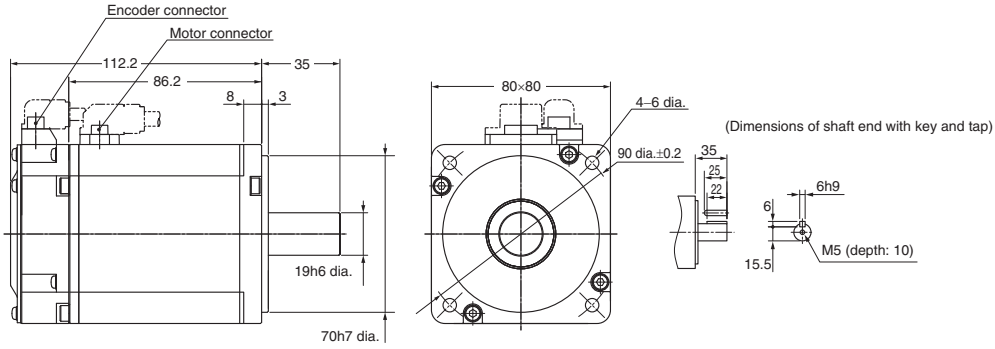
Model	Dimensions (mm)		
	LL	LM	S
R88M-K20030□-B□	116	93	11
R88M-K40030□-B□	135.5	112.5	14



750W

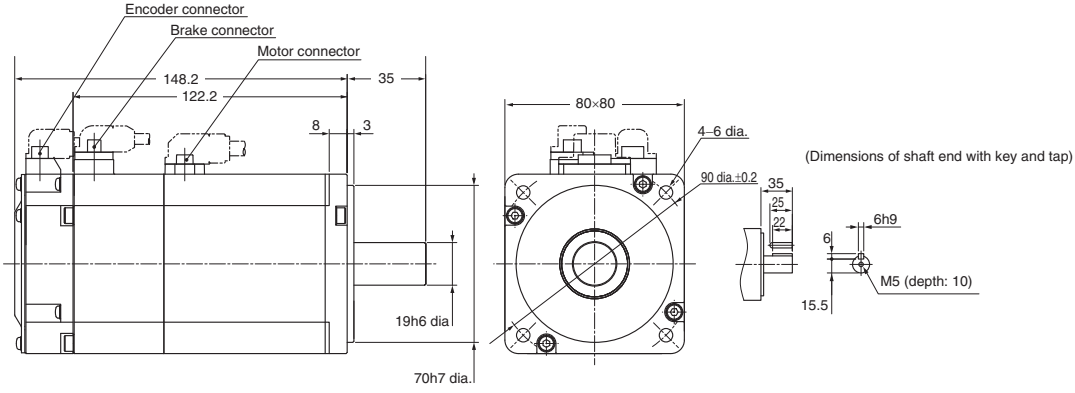
• Without brake

- R88M-K75030H (-S2) **INC**
- R88M-K75030T (-S2) **ABS**



With brake

- R88M-K75030H-B (S2) **INC**
- R88M-K75030T-B (S2) **ABS**



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

1kW/1.5kW/2kW

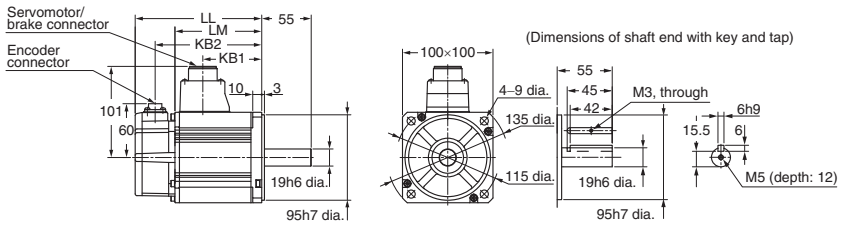
• Without brake

- R88M-K1K030H (-S2)/-K1K530H (-S2)/-K2K030H (-S2) **INC**
- R88M-K1K030T (-S2)/-K1K530T (-S2)/-K2K030T (-S2) **ABS**

• With brake

- R88M-K1K030H-B (S2)/-K1K530H-B (S2)/-K2K030H-B (S2) **INC**
- R88M-K1K030T-B (S2)/-K1K530T-B (S2)/-K2K030T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K1K030□	141	97	66	119
R88M-K1K530□	159.5	115.5	84.5	137.5
R88M-K2K030□	178.5	134.5	103.5	156.5
R88M-K1K030□-B□	168	124	66	146
R88M-K1K530□-B□	186.5	142.5	84.5	164.5
R88M-K2K030□-B□	205.5	161.5	103.5	183.5



3kW

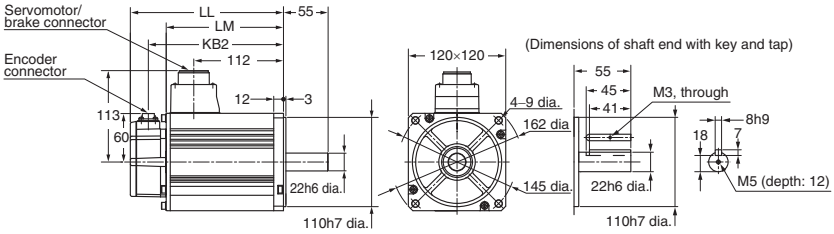
• Without brake

- R88M-K3K030H (-S2) **INC**
- R88M-K3K030T (-S2) **ABS**

• With brake

- R88M-K3K030H-B (S2) **INC**
- R88M-K3K030T-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	KB2
R88M-K3K030□	190	146	168
R88M-K3K030□-B□	215	171	193



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

4kW/5kW

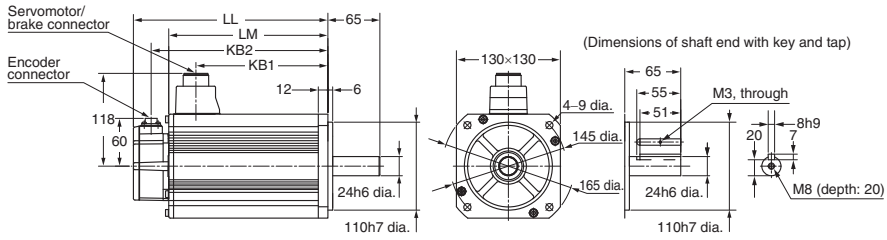
• Without brake

- R88M-K4K030H (-S2)/-K5K030H (-S2) **INC**
- R88M-K4K030T (-S2)/-K5K030T (-S2) **ABS**

• With brake

- R88M-K4K030H-B (S2)/-K5K030H-B (S2) **INC**
- R88M-K4K030T-B (S2)/-K5K030T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K030□	208	164	127	186
R88M-K5K030□	243	199	162	221
R88M-K4K030□-B□	233	189	127	211
R88M-K5K030□-B□	268	224	162	246



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 3,000 r/min Servomotors (400 VAC)

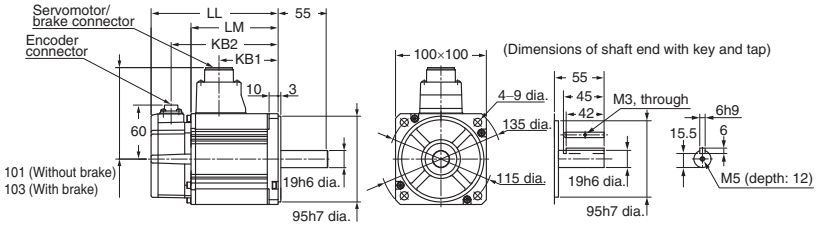
750W/1kW/1.5kW/2kW

• Without brake

- R88M-K75030F (-S2)/-K1K030F (-S2)/-K1K530F (-S2)/-K2K030F (-S2) **INC**
- R88M-K75030C (-S2)/-K1K030C (-S2)/-K1K530C (-S2)/-K2K030C (-S2) **ABS**

• With brake

- R88M-K75030F-B (S2)/-K1K030F-B (S2)/-K1K530F-B (S2)/-K2K030F-B (S2) **INC**
- R88M-K75030C-B (S2)/-K1K030C-B (S2)/-K1K530C-B (S2)/-K2K030C-B (S2) **ABS**



Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K75030□	131.5	87.5	56.5	109.5
R88M-K1K030□	141	97	66	119
R88M-K1K530□	159.5	115.5	84.5	137.5
R88M-K2K030□	178.5	134.5	103.5	156.5
R88M-K75030□-B□	158.5	114.5	53.5	136.5
R88M-K1K030□-B□	168	124	63	146
R88M-K1K530□-B□	186.5	142.5	81.5	164.5
R88M-K2K030□-B□	205.5	161.5	100.5	183.5

3kW

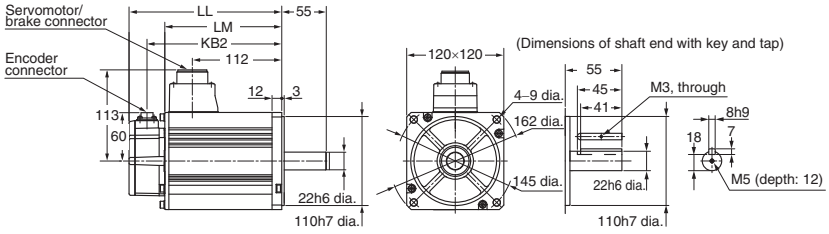
• Without brake

- R88M-K3K030F (-S2) **INC**
- R88M-K3K030C (-S2) **ABS**

• With brake

- R88M-K3K030F-B (S2) **INC**
- R88M-K3K030C-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	KB2
R88M-K3K030□	190	146	168
R88M-K3K030□-B□	215	171	193



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

4kW/5kW

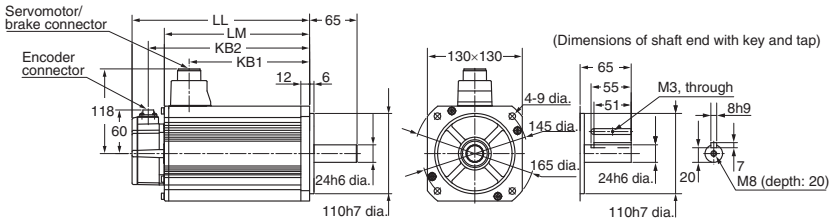
• Without brake

- R88M-K4K030F (-S2)/-K5K030F (-S2) **INC**
- R88M-K4K030C (-S2)/-K5K030C (-S2) **ABS**

• With brake

- R88M-K4K030F-B (S2)/-K5K030F-B (S2) **INC**
- R88M-K4K030C-B (S2)/-K5K030C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K030□	208	164	127	186
R88M-K5K030□	243	199	162	221
R88M-K4K030□-B□	233	189	127	211
R88M-K5K030□-B□	268	224	162	246



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,500r/min, 2,000 r/min Servomotors (200 VAC)

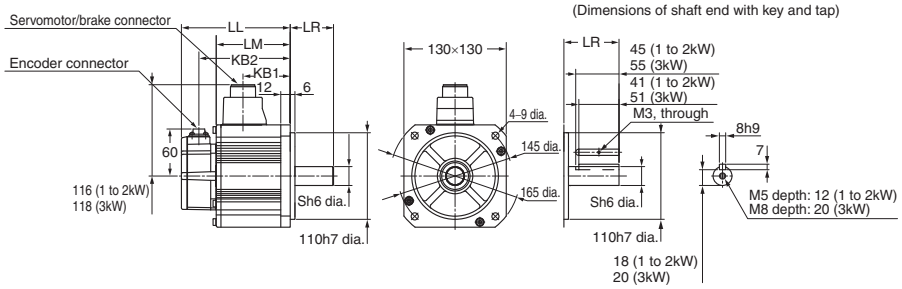
1kW/1.5kW/2kW/3kW

• Without brake

- R88M-K1K020H (-S2)/-K1K520H (-S2)/-K2K020H (-S2)/-K3K020H (-S2) **INC**
- R88M-K1K020T (-S2)/-K1K520T (-S2)/-K2K020T (-S2)/-K3K020T (-S2) **ABS**

• With brake

- R88M-K1K020H-B (S2)/-K1K520H-B (S2)/-K2K020H-B (S2)/-K3K020H-B (S2) **INC**
- R88M-K1K020T-B (S2)/-K1K520T-B (S2)/-K2K020T-B (S2)/-K3K020T-B (S2) **ABS**



Model	Dimensions (mm)					
	LL	LR	LM	S	KB1	KB2
R88M-K1K020□	138	55	94	22	60	116
R88M-K1K520□	155.5	55	111.5	22	77.5	133.5
R88M-K2K020□	173	55	129	22	95	151
R88M-K3K020□	208	65	164	24	127	186
R88M-K1K020□-B□	163	55	119	22	60	141
R88M-K1K520□-B□	180.5	55	136.5	22	77.5	158.5
R88M-K2K020□-B□	198	55	154	22	95	176
R88M-K3K020□-B□	233	65	189	24	127	211

4kW/5kW

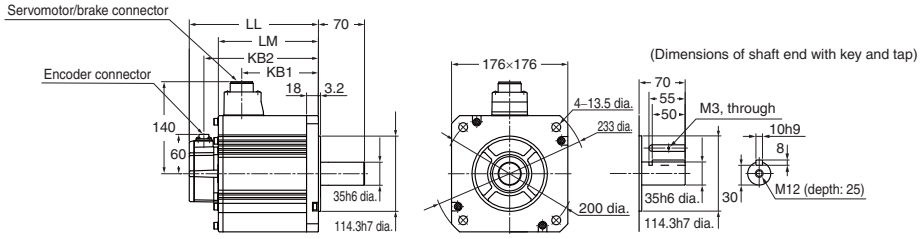
• Without brake

- R88M-K4K020H (-S2)/-K5K020H (-S2) **INC**
- R88M-K4K020T (-S2)/-K5K020T (-S2) **ABS**

• With brake

- R88M-K4K020H-B (S2)/-K5K020H-B (S2) **INC**
- R88M-K4K020T-B (S2)/-K5K020T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K020□	177	133	96	155
R88M-K5K020□	196	152	115	174
R88M-K4K020□-B□	202	158	96	180
R88M-K5K020□-B□	221	177	115	199



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

7.5kW

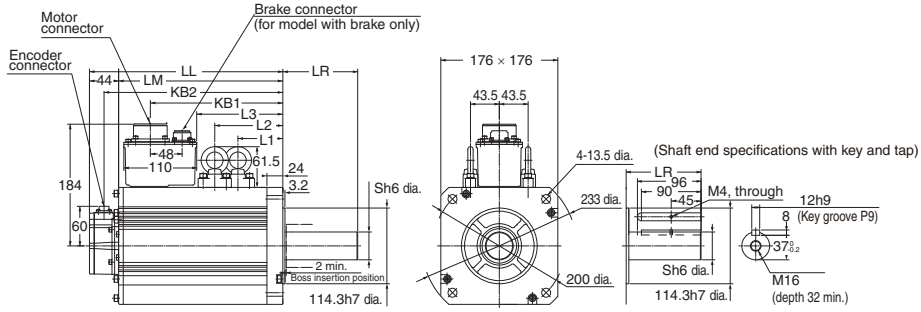
• Without brake

• R88M-K7K515T (-S2) **ABS**

• With brake

• R88M-K7K515T-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K7K515T□	312	113	268	42	219	290	117.5	117.5	149
R88M-K7K515T-B□	337	113	293	42	253	315	117.5	152.5	183



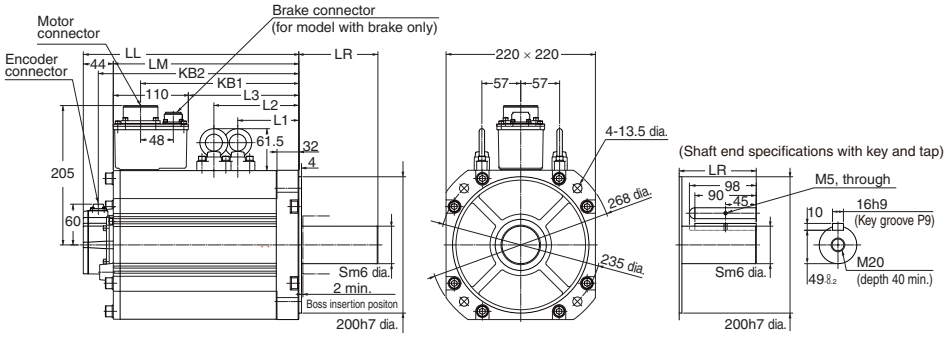
11kW/15kW

• Without brake

• R88M-K11K015T (-S2)/-K15K015T (-S2) **ABS**

• With brake

• R88M-K11K015T-B (S2)/R88M-K15K015T-B (S2) **ABS**



Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K11K015T□	316	116	272	55	232	294	124.5	124.5	162
R88M-K15K015T□	384	116	340	55	300	362	158.5	158.5	230
R88M-K11K015T-B□	364	116	320	55	266	342	124.5	159.5	196
R88M-K15K015T-B□	432	116	388	55	334	410	158.5	193.5	264

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,500 r/min, 2,000 r/min Servomotors (400 VAC)

400W/600W

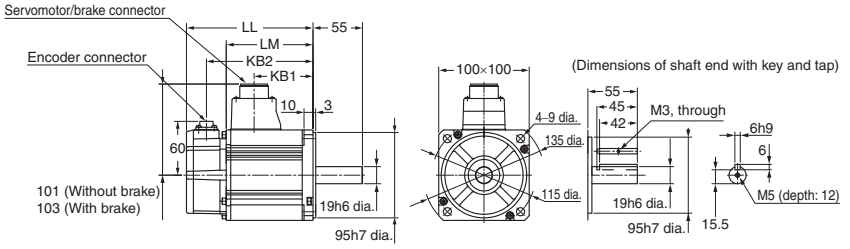
• Without brake

- R88M-K40020F (-S2)/-K60020F (-S2) **INC**
- R88M-K40020C (-S2)/-K60020C (-S2) **ABS**

• With brake

- R88M-K40020F-B (S2)/-K60020F-B (S2) **INC**
- R88M-K40020C-B (S2)/-K60020C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K40020□	131.5	87.5	56.5	109.5
R88M-K60020□	141	97	66	119
R88M-K40020□-B□	158.5	114.5	53.5	136.5
R88M-K60020□-B□	168	124	63	146



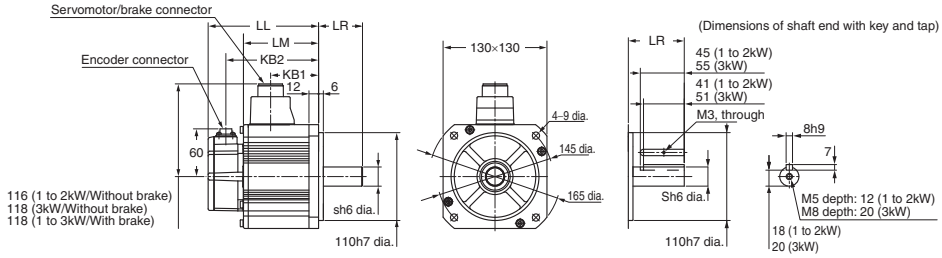
1kW/1.5kW/2kW/3kW

• Without brake

- R88M-K1K020F (-S2)/-K1K520F (-S2)/-K2K020F (-S2)/-K3K020F (-S2) **INC**
- R88M-K1K020C (-S2)/-K1K520C (-S2)/-K2K020C (-S2)/-K3K020C (-S2) **ABS**

• With brake

- R88M-K1K020F-B (S2)/-K1K520F-B (S2)/-K2K020F-B (S2)/-K3K020F-B (S2) **INC**
- R88M-K1K020C-B (S2)/-K1K520C-B (S2)/-K2K020C-B (S2)/-K3K020C-B (S2) **ABS**



Model	Dimensions (mm)					
	LL	LR	LM	S	KB1	KB2
R88M-K1K020□	138	55	94	22	60	116
R88M-K1K520□	155.5	55	111.5	22	77.5	133.5
R88M-K2K020□	173	55	129	22	95	151
R88M-K3K020□	208	65	164	24	127	186
R88M-K1K020□-B□	163	55	119	22	57	141
R88M-K1K520□-B□	180.5	55	136.5	22	74.5	158.5
R88M-K2K020□-B□	198	55	154	22	92	176
R88M-K3K020□-B□	233	65	189	24	127	211

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

4kW/5kW

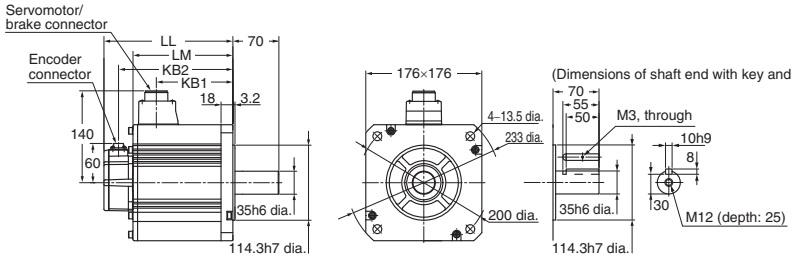
• Without brake

- R88M-K4K020F (-S2)/-K5K020F (-S2) **INC**
- R88M-K4K020C (-S2)/-K5K020C (-S2) **ABS**

• With brake

- R88M-K4K020F-B (S2)/-K5K020F-B (S2) **INC**
- R88M-K4K020C-B (S2)/-K5K020C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K020□	177	133	96	155
R88M-K5K020□	196	152	115	174
R88M-K4K020□-B□	202	158	96	180
R88M-K5K020□-B□	221	177	115	199



7.5kW

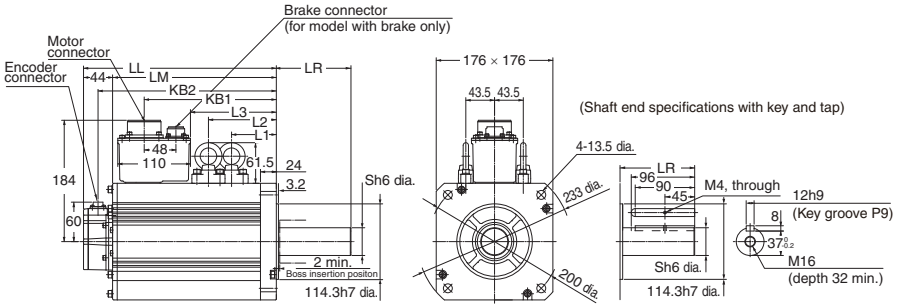
• Without brake

- R88M-K7K515C (-S2) **ABS**

• With brake

- R88M-K7K515C-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K7K515C□	312	133	268	42	219	290	117.5	117.5	149
R88M-K7K515C-B□	337	113	293	42	253	315	117.5	152.5	183



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

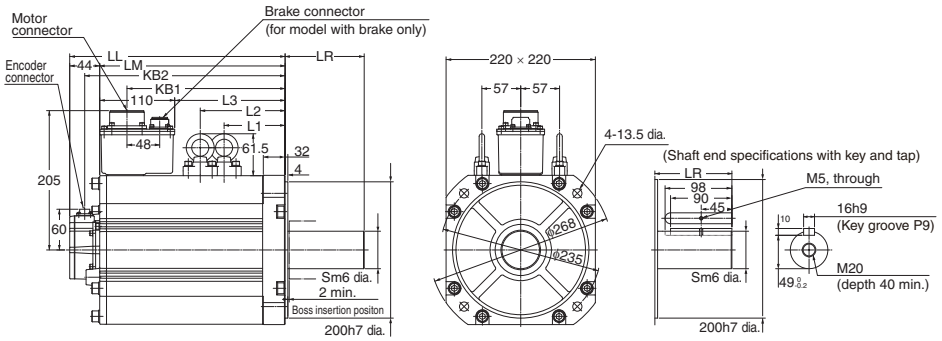
11kW/15kW

• Without brake

- R88M-K11K015C (-S2)/-K15K015C (-S2) **ABS**

• With brake

- R88M-K11K015C-B (S2)/R88M-K15K015C-B (S2) **ABS**



Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K11K015C□	316	116	272	55	232	294	124.5	124.5	162
R88M-K15K015C□	384	116	340	55	300	362	158.5	158.5	230
R88M-K11K015C-B□	364	116	320	55	266	342	124.5	159.5	196
R88M-K15K015C-B□	432	116	388	55	334	410	158.5	193.5	264

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,000 r/min Servomotors (200 VAC)

900W

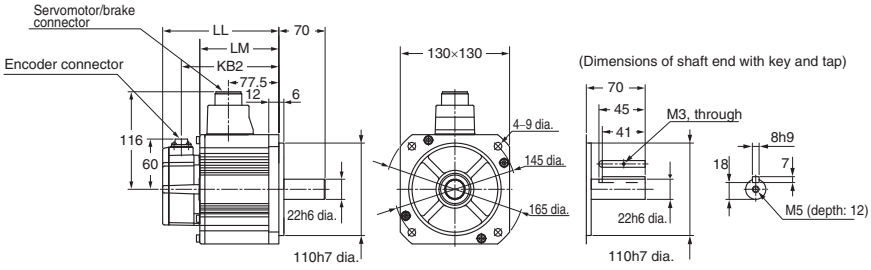
• Without brake

- R88M-K90010H (-S2) **INC**
- R88M-K90010T (-S2) **ABS**

• With brake

- R88M-K90010H-B (S2) **INC**
- R88M-K90010T-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	KB2
R88M-K90010□	155.5	111.5	133.5
R88M-K90010□-B□	180.5	136.5	158.5



2kW/3kW

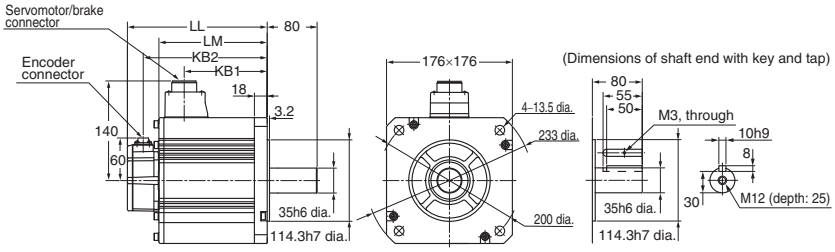
• Without brake

- R88M-K2K010H (-S2)/-K3K010H (-S2) **INC**
- R88M-K2K010T (-S2)/-K3K010T (-S2) **ABS**

• With brake

- R88M-K2K010H-B (S2)/-K3K010H-B (S2) **INC**
- R88M-K2K010T-B (S2)/-K3K010T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K2K010□	163.5	119.5	82.5	141.5
R88M-K3K010□	209.5	165.5	128.5	187.5
R88M-K2K010□-B□	188.5	144.5	82.5	166.5
R88M-K3K010□-B□	234.5	190.5	128.5	212.5



4.5kW

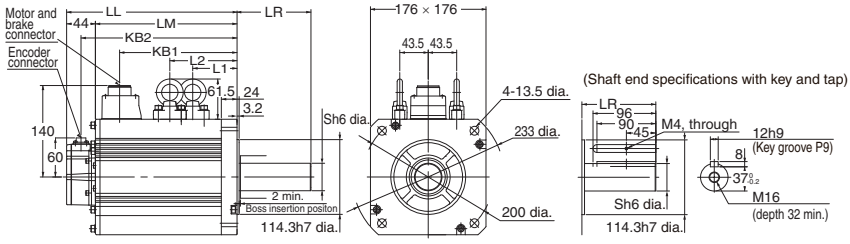
• Without brake

- R88M-K4K510T (-S2) **ABS**

• With brake

- R88M-K4K510T-B (S2) **ABS**

Model	Dimensions (mm)							
	LL	LR	LM	S	KB1	KB2	L1	L2
R88M-K4K510T□	266	113	222	42	185	244	98	98
R88M-K4K510T-B□	291	113	247	42	185	269	98	133

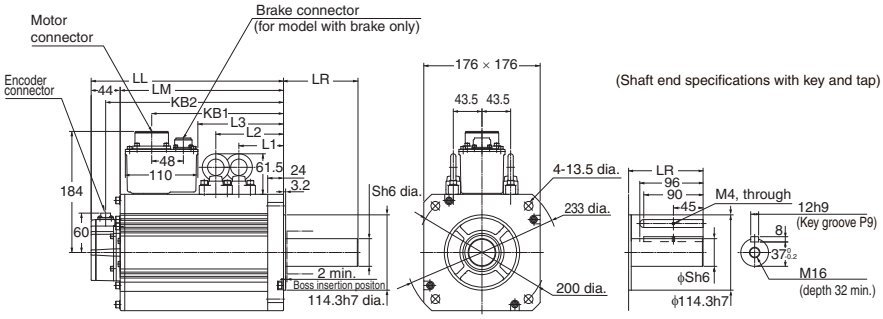


Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

6kW

- **Without brake**
  - R88M-K6K010T (-S2) **ABS**
- **With brake**
  - R88M-K6K010T-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K6K010T□	312	113	268	42	219	290	117.5	117.5	149
R88M-K6K010T-B□	337	113	293	42	253	315	117.5	152.5	183



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,000 r/min Servomotors (400 VAC)

900W

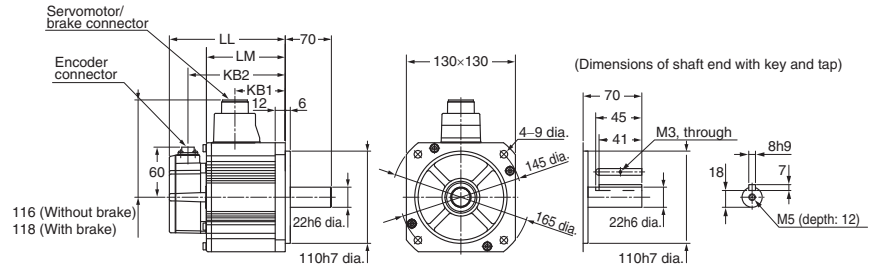
• Without brake

- R88M-K90010F (-S2) **INC**
- R88M-K90010C (-S2) **ABS**

• With brake

- R88M-K90010F-B (S2) **INC**
- R88M-K90010C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K90010□	155.5	111.5	77.5	133.5
R88M-K90010□-B□	180.5	136.5	74.5	158.5



2kW/3kW

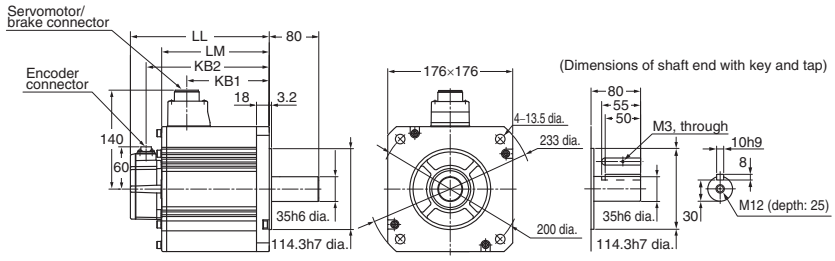
• Without brake

- R88M-K2K010F (-S2)/-K3K010F (-S2) **INC**
- R88M-K2K010C (-S2)/-K3K010C (-S2) **ABS**

• With brake

- R88M-K2K010F-B (S2)/-K3K010F-B (S2) **INC**
- R88M-K2K010C-B (S2)/-K3K010C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K2K010□	163.5	119.5	82.5	141.5
R88M-K3K010□	209.5	165.5	128.5	187.5
R88M-K2K010□-B□	188.5	144.5	82.5	166.5
R88M-K3K010□-B□	234.5	190.5	128.5	212.5



4.5kW

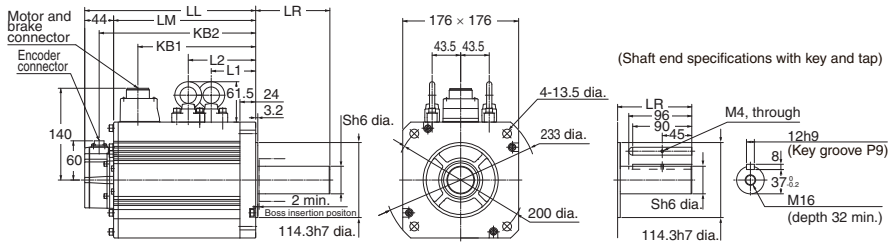
• Without brake

- R88M-K4K510C (-S2) **ABS**

• With brake

- R88M-K4K510C-B (S2) **ABS**

Model	Dimensions (mm)							
	LL	LR	LM	S	KB1	KB2	L1	L2
R88M-K4K510T□	266	113	222	42	185	244	98	98
R88M-K4K510T-B□	291	113	247	42	185	269	98	133

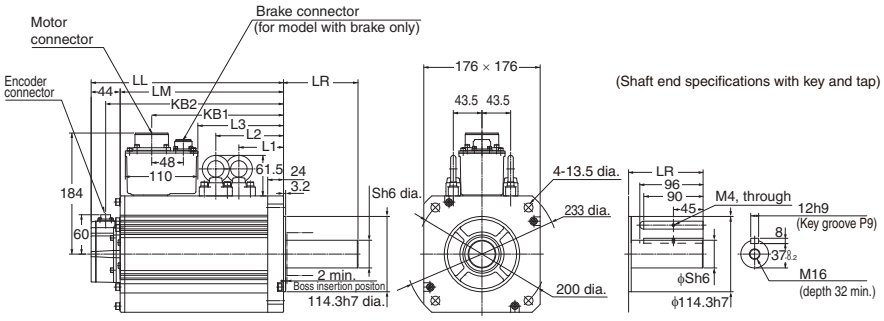


Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

6kW

- **Without brake**
  - R88M-K6K010C (-S2) **ABS**
- **With brake**
  - R88M-K6K010C-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K6K010C□	312	113	268	42	219	290	117.5	117.5	149
R88M-K6K010C-B□	337	113	293	42	253	315	117.5	152.5	183



Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

Combination table

Servo Drive and Servomotor Combinations (3,000 r/min, 2,000 r/min, 1,500r/min, 1,000 r/min)

<Cylinder Type>
3,000-r/min servomotors

Power Supply Voltage	Servo Drive Model Numbers	Servomotor Model Numbers		
	EtherCAT	Output	With incremental encoder	With absolute encoder
Single-phase 100 to 115 VAC	R88D-KNA5L-ECT	50 W	R88M-K05030H-□	R88M-K05030T-□
	R88D-KN01L-ECT	100 W	R88M-K10030L-□	R88M-K10030S-□
	R88D-KN02L-ECT	200 W	R88M-K20030L-□	R88M-K20030S-□
	R88D-KN04L-ECT	400 W	R88M-K40030L-□	R88M-K40030S-□
Single-phase/ three-phase 200 to 240 VAC	R88D-KN01H-ECT *	50 W	R88M-K05030H-□ *	R88M-K05030T-□ *
	R88D-KN01H-ECT	100 W	R88M-K10030H-□	R88M-K10030T-□
	R88D-KN02H-ECT	200 W	R88M-K20030H-□	R88M-K20030T-□
	R88D-KN04H-ECT	400 W	R88M-K40030H-□	R88M-K40030T-□
	R88D-KN08H-ECT	750 W	R88M-K75030H-□	R88M-K75030T-□
	R88D-KN15H-ECT *	1 kW	R88M-K1K030H-□ *	R88M-K1K030T-□ *
	R88D-KN15H-ECT	1.5 kW	R88M-K1K530H-□	R88M-K1K530T-□
Three-phase 200 to 240 VAC	R88D-KN20H-ECT	2 kW	R88M-K2K030H-□	R88M-K2K030T-□
	R88D-KN30H-ECT	3 kW	R88M-K3K030H-□	R88M-K3K030T-□
	R88D-KN50H-ECT *	4 kW	R88M-K4K030H-□ *	R88M-K4K030T-□ *
	R88D-KN50H-ECT	5 kW	R88M-K5K030H-□	R88M-K5K030T-□
Three-phase 400 to 480 VAC	R88D-KN10F-ECT *	750 W	R88M-K75030F-□ *	R88M-K75030C-□ *
	R88D-KN15F-ECT *	1 kW	R88M-K1K030F-□ *	R88M-K1K030C-□ *
	R88D-KN15F-ECT	1.5 kW	R88M-K1K530F-□	R88M-K1K530C-□
	R88D-KN20F-ECT	2 kW	R88M-K2K030F-□	R88M-K2K030C-□
	R88D-KN30F-ECT	3 kW	R88M-K3K030F-□	R88M-K3K030C-□
	R88D-KN50F-ECT *	4 kW	R88M-K4K030F-□ *	R88M-K4K030C-□ *
	R88D-KN50F-ECT	5 kW	R88M-K5K030F-□	R88M-K5K030C-□

1,500r/min, 2,000-r/min servomotors

Power Supply Voltage	Servo Drive Model Numbers	Servomotor Model Numbers		
	EtherCAT	Output	With incremental encoder	With absolute encoder
Single-phase/ three-phase 200 to 240 VAC	R88D-KN10H-ECT	1 kW	R88M-K1K020H-□	R88M-K1K020T-□
	R88D-KN15H-ECT	1.5 kW	R88M-K1K520H-□	R88M-K1K520T-□
Three-phase 200 to 240 VAC	R88D-KN20H-ECT	2 kW	R88M-K2K020H-□	R88M-K2K020T-□
	R88D-KN30H-ECT	3 kW	R88M-K3K020H-□	R88M-K3K020T-□
	R88D-KN50H-ECT *	4 kW	R88M-K4K020H-□ *	R88M-K4K020T-□ *
	R88D-KN50H-ECT	5 kW	R88M-K5K020H-□	R88M-K5K020T-□
	R88D-KN75H-ECT	7.5 kW	–	R88M-K7K515T-□
	R88D-KN150H-ECT *	11 kW	–	R88M-K11K015T-□ *
	R88D-KN150H-ECT	15 kW	–	R88M-K15K015T-□
Three-phase 400 to 480 VAC	R88D-KN06F-ECT *	400 W	R88M-K40020F-□ *	R88M-K40020C-□ *
	R88D-KN06F-ECT	600 W	R88M-K60020F-□	R88M-K60020C-□
	R88D-KN10F-ECT	1 kW	R88M-K1K020F-□	R88M-K1K020C-□
	R88D-KN15F-ECT	1.5 kW	R88M-K1K520F-□	R88M-K1K520C-□
	R88D-KN20F-ECT	2 kW	R88M-K2K020F-□	R88M-K2K020C-□
	R88D-KN30F-ECT	3 kW	R88M-K3K020F-□	R88M-K3K020C-□
	R88D-KN50F-ECT *	4 kW	R88M-K4K020F-□ *	R88M-K4K020C-□ *
	R88D-KN50F-ECT	5 kW	R88M-K5K020F-□	R88M-K5K020C-□
	R88D-KN75F-ECT	7.5 kW	–	RR88M-K7K515C-□
	R88D-KN150F-ECT *	11 kW	–	R88M-K11K015C-□ *
	R88D-KN150F-ECT	15 kW	–	R88M-K15K015C-□

* Please note the capacity of Servo Drive and Servomotor are not same in this combination.

1,000-r/min servomotors

Power Supply Voltage	Servo Drive Model Numbers	Servomotor Model Numbers		
	EtherCAT	Output	With incremental encoder	With absolute encoder
Single-phase/	R88D-KN15H-ECT *	900 W	R88M-K90010H-□ *	R88M-K90010T-□ *
Three-phase 200 to 240 VAC	R88D-KN30H-ECT *	2 kW	R88M-K2K010H-□ *	R88M-K2K010T-□ *
	R88D-KN50H-ECT *	3 kW	R88M-K3K010H-□ *	R88M-K3K010T-□ *
	R88D-KN50H-ECT *	4.5 kW	–	R88M-K4K510T-□ *
	R88D-KN75H-ECT *	6 kW	–	R88M-K6K010T-□ *
Three-phase 400 to 480 VAC	R88D-KN15F-ECT *	900 W	R88M-K90010F-□ *	R88M-K90010C-□ *
	R88D-KN30F-ECT *	2 kW	R88M-K2K010F-□ *	R88M-K2K010C-□ *
	R88D-KN50F-ECT *	3 kW	R88M-K3K010F-□ *	R88M-K3K010C-□ *
	R88D-KN50F-ECT *	4.5 kW	–	R88M-K4K510C-□ *
	R88D-KN75F-ECT *	6 kW	–	R88M-K6K010C-□ *

* Please note the capacity of Servo Drive and Servomotor are not same in this combination.

Servomotor and Decelerator Combinations (3,000 r/min, 2,000 r/min, 1,000 r/min)

<Cylinder Type>

3,000-r/min servomotors

Motor model	1/5	1/11 (1/9 for flange size No.11)	1/21	1/33	1/45
R88M-K05030□	R88G-HPG11B05100B□ (Also used with R88M-K10030□)	R88G-HPG11B09050B□ (Gear ratio 1/9)	R88G-HPG14A21100B□ (Also used with R88M-K10030□)	R88G-HPG14A33050B□	R88G-HPG14A45050B□
R88M-K10030□	R88G-HPG11B05100B□	R88G-HPG14A11100B□	R88G-HPG14A21100B□	R88G-HPG20A33100B□	R88G-HPG20A45100B□
R88M-K20030□	R88G-HPG14A05200B□	R88G-HPG14A11200B□	R88G-HPG20A21200B□	R88G-HPG20A33200B□	R88G-HPG20A45200B□
R88M-K40030□	R88G-HPG14A05400B□	R88G-HPG20A11400B□	R88G-HPG20A21400B□	R88G-HPG32A33400B□	R88G-HPG32A45400B□
R88M-K75030H/T (200 V)	R88G-HPG20A05750B□	R88G-HPG20A11750B□	R88G-HPG32A21750B□	R88G-HPG32A33750B□	R88G-HPG32A45750B□
R88M-K75030F/C (400 V)	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG32A33600SB□ (Also used with R88M-K60020□)	R88G-HPG50A451K5B□ (Also used with R88M-K1K530□)
R88M-K1K030□	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG50A332K0B□ (Also used with R88M-K2K030□)	R88G-HPG50A451K5B□ (Also used with R88M-K1K530□)
R88M-K1K530□	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□	R88G-HPG50A332K0B□ (Also used with R88M-K2K030□)	R88G-HPG50A451K5B□
R88M-K2K030□	R88G-HPG32A052K0B□	R88G-HPG32A112K0B□	R88G-HPG50A212K0B□	R88G-HPG50A332K0B□	–
R88M-K3K030□	R88G-HPG32A053K0B□	R88G-HPG50A113K0B□	R88G-HPG50A213K0B□	–	–
R88M-K4K030□	R88G-HPG32A054K0B□	R88G-HPG50A115K0B□ (Also used with R88M-K5K030□)	–	–	–
R88M-K5K030□	R88G-HPG50A055K0B□	R88G-HPG50A115K0B□	–	–	–

2,000-r/min servomotors

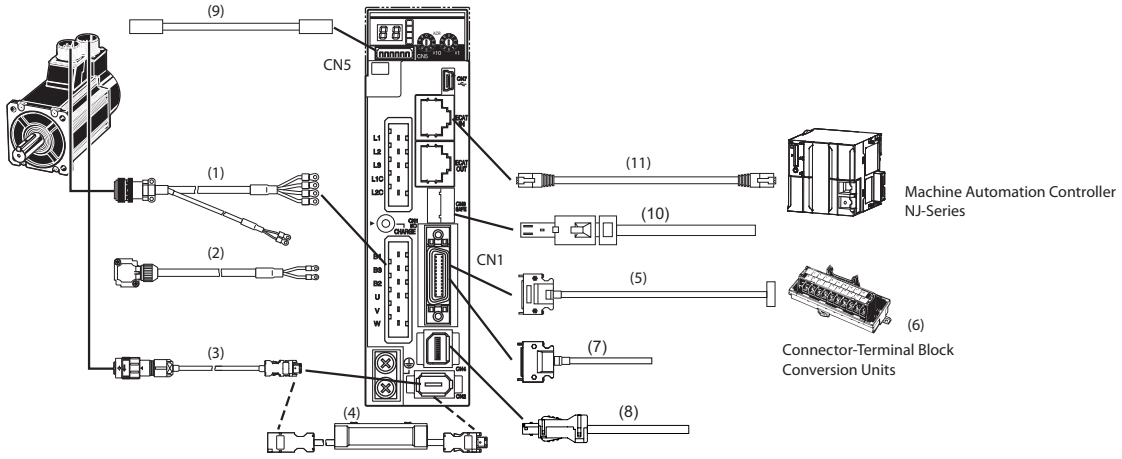
Motor model	1/5	1/11	1/21 (1/20 for flange size No.65)	1/33 (1/25 for flange size No.65)	1/45
R88M-K40020□ (Only 400 V)	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG32A33600SB□ (Also used with R88M-K60020□)	R88G-HPG32A45400SB□
R88M-K60020□ (Only 400 V)	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG32A33600SB□	R88G-HPG50A451K5B□ (R88M-K1K530□)
R88M-K1K020□	R88G-HPG32A053K0B□ (Also used with R88M-K3K030□)	R88G-HPG32A112K0SB□ (Also used with R88M-K2K020□)	R88G-HPG32A211K0SB□	R88G-HPG50A332K0SB□ (Also used with R88M-K2K020□)	R88G-HPG50A451K0SB□
R88M-K1K520□	R88G-HPG32A053K0B□ (Also used with R88M-K3K030□)	R88G-HPG32A112K0SB□ (Also used with R88M-K2K020□)	R88G-HPG50A213K0B□ (Also used with R88M-K3K030□)	R88G-HPG50A332K0SB□ (Also used with R88M-K2K020□)	–
R88M-K2K020□	R88G-HPG32A053K0B□ (Also used with R88M-K3K030□)	R88G-HPG32A112K0SB□	R88G-HPG50A213K0B□ (Also used with R88M-K3K030□)	R88G-HPG50A332K0SB□	–
R88M-K3K020□	R88G-HPG32A054K0B□ (Also used with R88M-K4K030□)	R88G-HPG50A115K0B□ (Also used with R88M-K5K030□)	R88G-HPG50A213K0SB□	R88G-HPG65A253K0SB□	–
R88M-K4K020□	R88G-HPG50A055K0SB□ (Also used with R88M-K5K020□)	R88G-HPG50A115K0SB□ (Also used with R88M-K3K030□)	R88G-HPG65A205K0SB□ (Also used with R88M-K3K030□)	R88G-HPG65A255K0SB□ (Also used with R88M-K5K020□)	–
R88M-K5K020□	R88G-HPG50A055K0SB□	R88G-HPG50A115K0SB□	R88G-HPG65A205K0SB□	R88G-HPG65A255K0SB□	–

1,000-r/min servomotors

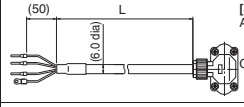
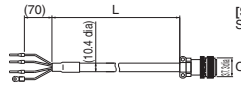
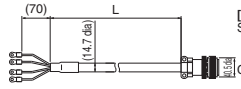
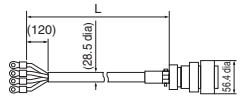
Motor model	1/5	1/11	1/21 (1/20 for flange size No.65)	1/33 (1/25 for flange size No.65)
R88M-K90010□	R88G-HPG32A05900TB□ (Also used with R88M-K5K020□)	R88G-HPG32A11900TB□ (Also used with R88M-K2K020□)	R88G-HPG50A21900TB□ (Also used with R88M-K3K030□)	R88G-HPG50A33900TB□ (Also used with R88M-K2K020□)
R88M-K2K010□	R88G-HPG32A052K0TB□	R88G-HPG50A112K0TB□	R88G-HPG50A212K0TB□ (Also used with R88M-K5K020□)	R88G-HPG65A255K0SB□ (Also used with R88M-K5K020□)
R88M-K3K010□	R88G-HPG50A055K0SB□ (Also used with R88M-K5K020□)	R88G-HPG50A115K0SB□ (Also used with R88M-K5K020□)	R88G-HPG65A205K0SB□ (Also used with R88M-K5K020□)	R88G-HPG65A255K0SB□ (Also used with R88M-K5K020□)

Cable Combinations

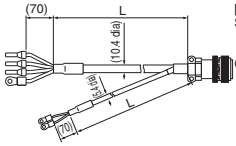
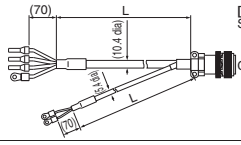
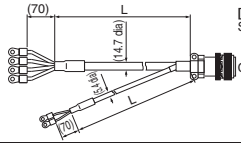
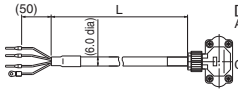
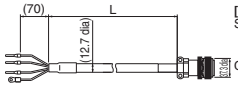
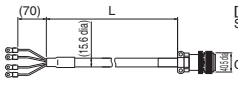
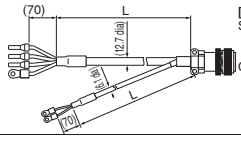
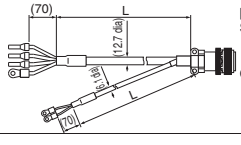
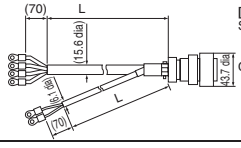
● EtherCAT Communications



Servomotor Power Cables (For CNB)

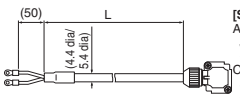
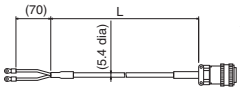
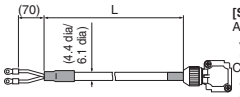
Symbol			Name	Connected to	Model	Description
(1)	Standard Cables	Without Brakes	Standard Servomotor Power Cables for Servomotors without Brakes	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Angle plug: JN8FT04SJ1 (Japan Aviation Electronics Industry, Ltd.) Contact pins: ST-TMH-S-C1B-3500-A534G (Japan Aviation Electronics Industry, Ltd.)
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-4S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 750 W to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W		
				[200 V] [400 V] Cylindrical Servomotors, 3,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 4.5 kW	R88A-CAGD□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B22-22S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 1,500 r/min, 7.5 kW Cylindrical Servomotors, 1,000 r/min, 6 kW	R88A-CAGE□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B32-17S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-20A (Japan Aviation Electronics Industry, Ltd.)

Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Symbol			Name	Connected to	Model	Description
(1)	Standard Cables	With Brakes	Standard Servomotor Power Cables for Servomotors with Brakes	**Note:** Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.		
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-18S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAKF□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 3,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 3 kW	R88A-CAGD□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)
	Robot Cables	Without Brakes	Robot Servomotor Power Cables for Servomotors without Brakes	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□SR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Angle plug: JN8FT04SJ1 (Japan Aviation Electronics Industry, Ltd.) Connector pins: ST-TMH-S-C1B-3500-A534G (Japan Aviation Electronics Industry, Ltd.)
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W [400 V] Cylindrical Servomotors, 3,000 r/min, 750 W to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□SR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-4S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 1,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 4.5 kW	R88A-CAGD□□□SR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B22-22S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
		With Brakes	Robot Servomotor Power Cables for Servomotors with Brakes	**Note:** Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.		
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□BR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-18S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAKF□□□BR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 1,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 3 kW	R88A-CAGD□□□BR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)

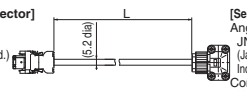
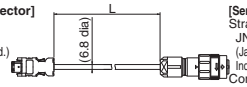
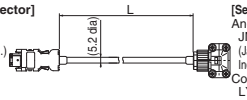
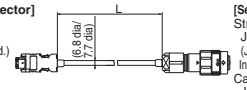
Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Brake Cables

Symbol		Name	Connected to	Model	Description
(2)	Standard Cables	Brake Cables (Standard Cables)	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 4.4 dia 30 to 50 m: 5.4 dia)	 **[Servomotor Connector]** Angle plug: JN4FT02SJ1-R (Japan Aviation Electronics Industry, Ltd.) Connector pins: ST-TMH-S-C1B-3500-(A534G) (Japan Aviation Electronics Industry, Ltd.)
			[200 V] [400 V] Cylindrical Servomotors, 1,500 r/min, 7.5 to 15 kW 1,000 r/min, 6 kW	R88A-CAGE□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (5.4 dia)	 **[Servomotor Connector]** Angle plug: N/MS3106B14S-2S (Japan Aviation Electronics Industry, Ltd.) Connector pins: N/MS3057-6A (Japan Aviation Electronics Industry, Ltd.)
	Robot Cables	Brake Cables (Robot Cables)	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□BR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 4.4 dia 30 to 50 m: 6.1 dia)	 **[Servomotor Connector]** Angle plug: JN4FT02SJ1-R (Japan Aviation Electronics Industry, Ltd.) Connector pins: ST-TMH-S-C1B-3500-(A534G) (Japan Aviation Electronics Industry, Ltd.)

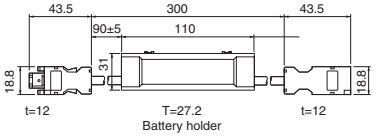
Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Encoder Cables (for CN2)

Symbol		Name	Connected to	Model	Description
(3)	Standard Cables	Standard Encoder Cables with Connectors	Cylindrical Servomotors, 3,000 r/min, 50 to 750 W (Absolute encoder/ Incremental encoder)	R88A-CRKA□□□C The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 5.2 dia 30 to 50 m: 6.8 dia)	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Angle clamp: JN6FR07SM1 (Japan Aviation Electronics Industry, Ltd.) Connector pins: LY10-C1-A1-10000 (Japan Aviation Electronics Industry, Ltd.)
			Cylindrical Servomotors, 3,000 r/min, For 1 kW (200 V) For 750 W (400 V) Cylindrical Servomotors, 2,000 r/min, Cylindrical Servomotors, 1,000 r/min, (Absolute encoder/ Incremental encoder)	R88A-CRKC□□□N The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Straight plug: JN2DS10SL2-R (Japan Aviation Electronics Industry, Ltd.) Contact: JN1-22-20S-10000 (Japan Aviation Electronics Industry, Ltd.)
	Robot Cables	Robot Encoder Cables with Connectors	Cylindrical Servomotors, 3,000 r/min, 50 to 750 W (Absolute encoder/ Incremental encoder)	R88A-CRKA□□□CR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 5.2 dia 30 to 50 m: 6.8 dia)	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Angle clamp: JN6FR07SM1 (Japan Aviation Electronics Industry, Ltd.) Connector pins: LY10-C1-A1-10000 (Japan Aviation Electronics Industry, Ltd.)
			Cylindrical Servomotors, 3,000 r/min, For 1 kW (200 V) For 750 W (400 V) Cylindrical Servomotors, 2,000 r/min, Cylindrical Servomotors, 1,000 r/min, (Absolute encoder/ Incremental encoder)	R88A-CRKC□□□NR(-E) The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 6.8 dia 30 to 50 m: 7.7 dia)	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Straight plug: JN2DS10SL2-R (Japan Aviation Electronics Industry, Ltd.) Cable clamp: JN1-22-22S-10000 (Japan Aviation Electronics Industry, Ltd.)

Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Absolute Encoder Backup Battery and Absolute Encoder Battery Cable

Symbol	Name	Specifications		Model	Description
(4)	Absolute Encoder Battery Cable	Battery not included	0.3 m	R88A-CRGD0R3C	
		One R88A-BAT01G Battery included.	0.3 m	R88A-CRGD0R3C-BS	
	Absolute Encoder Backup Battery	–		R88A-BAT01G	–

Control Cables (for CN1)

Symbol	Name		Connected to		Model
(5)	For Connector Terminal Block	Connector Terminal Block Cables	Cable for EtherCAT Communications		XW2Z-□□□J-B34 The empty boxes in the model number are for the cable length. The cable can be 1, or 2 m long.
(6)		Connector-Terminal Block Conversion Units	Cable for EtherCAT Communications	M3 screws	XW2B-20G4
				M3.5 screws	XW2B-20G5
				M3 screws	XW2D-20G6
(7)	General-purpose Control Cables with Connector on One End		Cables for General-Purpose Connection		R88A-CPKB□□□S-E The empty boxes in the model number are for the cable length. The cable can be 1, or 2 m long.

External Encoder Cable (for CN4)

Symbol	Name	Lengths	Model
(8)	External Encoder Cable (CN4) Flexible Cable Type	5 m	R88A-CRKM005SR-E
		10 m	R88A-CRKM010SR-E
		20 m	R88A-CRKM020SR-E

Analog Monitor Cable (for CN5)

Symbol	Name	Lengths	Model
(9)	Analog Monitor Cable	1 m	R88A-CMK001S

Safety Cable (for CN8)

Symbol	Name	Lengths	Model
(10)	Safety Connector with Cable	3 m	R88A-CSK003S-E

EtherCAT Communication Cable

Symbol	Name	Description
(11)	Ethernet Cable	EtherCAT Communication Cables • Use a category 5 or higher cable with double, aluminum tape and braided shielding. Connector (Modular Plug) Specifications • Use a category 5 or higher, shielded connector.

Servo Drive Connectors

Connectors	Description		Model
CN1	Control I/O Connector		R88A-CNW01C
CN2	Encoder Connector		R88A-CNW01R
CN4	External Encoder connector		R88A-CNK41L
CN8	Safety I/O Signal Connector		R88A-CNK81S
CNA	Main Circuit Power Supply Connector	[100VAC] 50W-400W [200VAC] 100W-1.5kW	R88A-CNA02G-AP
		[200VAC] 2.0kW	R88A-CNA02K-AP
		[400VAC] 600W-1.5kW	R88A-CNA01K-AP
		[400VAC] 2.0kW	R88A-CNA03K-AP
CNB	Servomotor Power Connector	[100VAC] 50W-400W [200VAC] 100W-1.5kW	R88A-CNB01G-AP
		[400VAC] 600W-1.5kW	R88A-CNB01K-AP
		[200VAC] 2.0kW [400VAC] 2.0kW	R88A-CNB02K-AP
CNC	24Vdc Control Circuit Connector	[400VAC] 600W-2.0kW	R88A-CNC01K-AP
CND	Regenerative Resistor Connector	[400VAC] 600W-1.5kW	R88A-CND01K-AP
		[200VAC] 2.0kW [400VAC] 2.0kW	R88A-CND02K-AP

Servomotor Connector

Description	Applicable Servomotor Capacity	Model
Servomotor Encoder Connector	[100 V/200 V] 3,000 r/min (50 to 750 W)	R88A-CNK02R
	[100 V/200 V] 3,000 r/min (1 to 5 kW), 2,000 r/min, 1,000 r/min [400 V] 3,000 r/min, 2,000 r/min, 1,000 r/min	R88A-CNK04R
Power cable connector	[100 V/200 V] 3,000 r/min (50 to 750 W)	R88A-CNK11A
	[200 V] [400V] 1,500 r/min (7.5 to 15kW) 1,000 r/min (6.0kW)	R88A-CNK21A-AP
Brake cable connector	[100 V/200 V] 3,000 r/min (50 to 750 W)	R88A-CNK11B
	[200 V] [400V] 1,500 r/min (7.5 to 15kW) 1,000 r/min (6.0kW)	R88A-CNK21B-AP

Multi-function Compact Inverter

MX2-Series

With Machine Automation Mentality

- Current vector Control.
- High Starting torque: 200% at 0.5 Hz.
- Double rating VT 120%/1 min and CT 150% /1 min.
- Speed range up to 1,000 Hz.
- Positioning functionality.
- Safety function *2 EN ISO13849-1:2008 (Cat.3/PLd) IEC60204-1 Stop Category 0
- Fieldbus communications with optional unit: EtherCAT, CompoNet and DeviceNet *1
- Modbus communications.

*1 Optional communication unit can be used with the inverter 3G3MX2 of unit version 1.1 or higher.

*2 When the EtherCAT communication unit is mounted onto the MX2, the inverter will not conform to the safety standards.

Performance Specifications

Inverter 3G3MX2

3-phase 200 V Class

Function name			3-phase 200 V										
Model name (3G3MX2-)			A2001	A2002	A2004	A2007	A2015	A2022	A2037	A2055	A2075	A2110	A2150
Applicable motor capacity	kW	CT	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
		VT	0.2	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11	15	18.5
	HP	CT	1/8	1/4	1/2	1	2	3	5	7 1/2	10	15	20
		VT	1/4	1/2	1	1 1/2	3	4	7 1/2	10	15	20	25
Rated output capacity [kVA]	200 V	CT	0.2	0.5	1.0	1.7	2.7	3.8	6.0	8.6	11.4	16.2	20.7
		VT	0.4	0.6	1.2	2.0	3.3	4.1	6.7	10.3	13.8	19.3	23.9
	240 V	CT	0.3	0.6	1.2	2.0	3.3	4.5	7.2	10.3	13.7	19.5	24.9
		VT	0.4	0.7	1.4	2.4	3.9	4.9	8.1	12.4	16.6	23.2	28.6
Rated input voltage			3-phase 200 V - 15% to 240 V + 10%, 50/60 ± 5%										
Rated input current [A]		CT	1.0	1.6	3.3	6.0	9.0	12.7	20.5	30.8	39.6	57.1	62.6
		VT	1.2	1.9	3.9	7.2	10.8	13.9	23.0	37.0	48.0	68.0	72.0
Rated output voltage			3-phase 200 to 240 V (The output cannot exceed the incoming voltage).										
Rated output current [A]		CT	1.0	1.6	3.0	5.0	8.0	11.0	17.5	25.0	33.0	47.0	60.0
		VT	1.2	1.9	3.5	6.0	9.6	12.0	19.6	30.0	40.0	56.0	69.0
Short-time deceleration braking torque (%) (Discharge Resistor not connected)			50	50	50	50	50	20	20	20	20	10	10
Braking Resistor circuit *	Regenerative braking		Built-in Braking Resistor circuit (separate Discharge Resistor)										
	Min. connectable resistance [Ω]		100	100	100	50	50	35	35	20	17	17	10
Weight [kg]			1.0	1.0	1.1	1.2	1.6	1.8	2.0	3.3	3.4	5.1	7.4
Dimensions (width × height) [mm]			68 × 128				108 × 128		140 × 128	140 × 260		180 × 296	220 × 350
Dimensions (depth) [mm]			109		122.5	145.5	170.5		170.5	155		175	

* The BRD usage is 10%.

3-phase 400 V Class

Function name			3-phase 400 V									
Model name (3G3MX2-)			A4004	A4007	A4015	A4022	A4030	A4040	A4055	A4075	A4110	A4150
Applicable motor capacity	kW	CT	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15
		VT	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5
	HP	CT	1/2	1	2	3	4	5	7 1/2	10	15	20
		VT	1	2	3	4	5	7 1/2	10	15	20	25
Rated output capacity [kVA]	380 V	CT	1.1	2.2	3.1	3.6	4.7	6.0	9.7	11.8	15.7	20.4
		VT	1.3	2.6	3.5	4.5	5.7	7.3	11.5	15.1	20.4	25.0
	480 V	CT	1.4	2.8	3.9	4.5	5.9	7.6	12.3	14.9	19.9	25.7
		VT	1.7	3.4	4.4	5.7	7.3	9.2	14.5	19.1	25.7	31.5
Rated input voltage			3-phase 380 V - 15% to 480 V + 10%, 50/60 ± 5%									
Rated input current [A]		CT	1.8	3.6	5.2	6.5	7.7	11.0	16.9	18.8	29.4	35.9
		VT	2.1	4.3	5.9	8.1	9.4	13.3	20.0	24.0	38.0	44.0
Rated output voltage			3-phase 380 to 480 V (The output cannot exceed the incoming voltage).									
Rated output current [A]		CT	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0
		VT	2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0
Short-time deceleration braking torque (%) (Discharge Resistor not connected)			50	50	50	20	20	20	20	20	10	10
Braking Resistor circuit *	Regenerative braking		Built-in Braking Resistor circuit (separate Discharge Resistor)									
	Min. connectable resistance [Ω]		180	180	180	100	100	100	70	70	70	35
Weight [kg]			1.5	1.6	1.8	1.9	1.9	2.1	3.5	3.5	4.7	5.2
Dimensions (width × height) [mm]			108 × 128					140 × 128	140 × 260		180 × 296	
Dimensions (depth) [mm]			143.5	170.5				170.5	155		175	

* The BRD usage is 10%.

1-phase 200 V Class

Function name			1-phase 200 V					
Model name (3G3MX2-)			AB001	AB002	AB004	AB007	AB015	AB022
Applicable motor capacity	kW	CT	0.1	0.2	0.4	0.75	1.5	2.2
		VT	0.2	0.4	0.55	1.1	2.2	3.0
	HP	CT	1/8	1/4	1/2	1	2	3
		VT	1/4	1/2	3/4	1 1/2	3	4
Rated output capacity [kVA]	200 V	CT	0.2	0.5	1.0	1.7	2.7	3.8
		VT	0.4	0.6	1.2	2.0	3.3	4.1
	240 V	CT	0.3	0.6	1.2	2.0	3.3	4.5
		VT	0.4	0.7	1.4	2.4	3.9	4.9
Rated input voltage			1-phase 200 V - 15% to 240 V + 10%, 50/60 Hz ± 5%					
Rated input current [A]		CT	1.3	3.0	6.3	11.5	16.8	22.0
		VT	2.0	3.6	7.3	13.8	20.2	24.0
Rated output voltage			3-phase 200 to 240 V (The output cannot exceed the incoming voltage).					
Rated output current [A]		CT	1.0	1.6	3.0	5.0	8.0	11.0
		VT	1.2	1.9	3.5	6.0	9.6	12.0
Short-time deceleration braking torque (%) (Discharge Resistor not connected)			50	50	50	50	50	20
Braking Resistor circuit *	Regenerative braking		Built-in Braking Resistor circuit (separate Discharge Resistor)					
	Min. connectable resistance [Ω]		100	100	100	50	50	35
Weight [kg]			1.0	1.0	1.1	1.6	1.8	1.8
Dimensions (width × height) [mm]			68 × 128			108 × 128		
Dimensions (depth) [mm]			109		122.5	170.5		

* The BRD usage is 10%.

MX2-Series EtherCAT Communication Unit 3G3AX-MX2-ECT

This is the communication unit to connect the Multi-function Compact Inverter MX2 to EtherCAT network.
This communication unit passed the conformance test of EtherCAT.
Note: EtherCAT Communication Unit 3G3AX-MX2-ECT can be used with the inverter 3G3MX2 of unit version 1.1 or higher.

Common Specifications

Item		Specifications
Model		3G3AX-MX2-ECT
Power supply		Supplied from the inverter
Protective structure		Open type (IP20)
Temperature		–10 to +50°C
Storage temperature		–20 to +65°C
Humidity		20% to 90% RH (with no condensation)
Vibration		5.9 m/s^2 (0.6 G), 10 to 55 Hz
Application environment		At a maximum altitude of 1,000 m; indoors (without corrosive gases or dust)
Weight		100 g max.
International standard	UL/cUL	UL508C
	EC directive	EMC Directive :EN61800-3 Low Voltage Directive :EN61800-5-1

EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12, IEC 61800-7 CiA 402 drive profile
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 × 2 (shielded type) ECAT IN : EtherCAT input ECAT OUT : EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	FreeRun mode (asynchronous)
LED display	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
CiA402 drive profile	Velocity mode

Function Specifications

Function name		Specifications
Enclosure ratings *1		Open type (IP20)
Control	**Control method**	Phase-to-phase sinusoidal modulation PWM
	Output frequency range *2	0.10 to 400 Hz (or 1,000 Hz in the high-frequency mode; restrictions apply)
	Frequency precision *3	Digital command: ±0.01% of the max. frequency, Analog command: ±0.2% of the max. frequency (25°C±10°C)
	Frequency setting resolution	Digital setting: 0.01 Hz, Analog setting: One-thousandth of the maximum frequency
	Voltage/Frequency characteristics	V/f characteristics (constant/reduced torque) Sensorless vector control, V/f control with speed feedback
	Overload current rating	Heavy load rating (CT): 150%/60 s Light load rating (VT): 120%/60 s
	Instantaneous overcurrent protection	200% of the value of heavy load rating (CT)
	Acceleration/Deceleration time	0.01 to 3600 s (linear/curve selection), acceleration/deceleration 2 setting available
	Carrier frequency adjustment range	2 to 15 kHz (with derating)
	Starting torque	200%/0.5 Hz (sensorless vector control)
	External DC injection braking	Starts at a frequency lower than that in deceleration via the STOP command, at a value set lower than that during operation, or via an external input. (Level and time settable).
Protective functions		Overcurrent, overvoltage, undervoltage, electronic thermal, temperature error, ground fault overcurrent at power-on status, rush current prevention circuit, overload limit, incoming overvoltage, external trip, memory error, CPU error, USP error, communication error, overvoltage suppression during deceleration, protection upon momentary power outage, emergency cutoff, etc.
Input signal	**Frequency settings**	Digital Operator External analog input signal: Variable resistance/0 to 10 VDC/4 to 20 mA, Modbus communication (Modbus-RTU)
	RUN/STOP command	Digital Operator External digital input signal (3-wire input supported), Modbus communication (Modbus-RTU)
	Multi-function input	7 points (Selectable from 59 functions)
	Analog input	2 points (Voltage FV terminal: 10 bits/0 to 10 V, Current FI terminal: 10 bits/4 to 20 mA)
	Pulse input	1 point (RP terminal: 32 kHz max., 5 to 24 VDC)
Output signal	**Multi-function output**	2 points (P1/EDM, P2; selectable from 43 functions)
	Relay output	1 point (1c contact: MC, MA, MB; selectable from 43 functions)
	Analog output (Frequency monitor)	1 point (AM terminal: Voltage 10 bits/0 to 10 V) (Frequency, current selectable)
	Pulse output	1 point (MP terminal: 32 kHz max., 0 to 10 V)
Communications	**RS-422**	RJ45 connector (for Digital Operator)
	RS-485	Control circuit terminal block, Modbus communication (Modbus-RTU)
	USB	USB1.1, mini-B connector
Other functions		AVR function, V/f characteristics switching, upper/lower limit, 16-step speeds, starting frequency adjustment, jogging operation, carrier frequency adjustment, PID control, frequency jump, analog gain/bias adjustment, S shape acceleration/deceleration, electronic thermal characteristics, level adjustment, restart function, torque boost function, fault monitor, soft lock function, frequency conversion display, USP function, motor 2 control function, UP/DWN, overcurrent suppression function, etc.
General specifications	**Ambient temperature**	-10 to 50°C (However, derating is required).
	Ambient storage temperature	-20°C to 65°C (short-time temperature during transport)
	Humidity	20% to 90% RH (with no condensation)
	Vibration	5.9 m/s^2 (0.6G), 10 to 55 Hz
	Location	At a maximum altitude of 1,000 m; indoors (without corrosive gases or dust)
Options		DC reactor, AC reactor, radio noise filter, input noise filter, output noise filter, regenerative braking unit, Braking Resistor, EMC noise filter, etc.

Note: 1. The applicable motor is a 3-phase standard motor. For using any other type, be sure that the rated current does not exceed that of the Inverter.
2. Output voltage decreases according to the level of the power supply voltage.
3. The braking torque at the time of capacitor feedback is an average deceleration torque at the shortest deceleration (when it stops from 50 Hz). It is not a continuous regeneration torque. Also, the average deceleration torque varies depending on the motor loss. The value is reduced in operation over 50 Hz.

*1 Protection method complies with JEM 1030.
*2 To operate the motor at over 50/60 Hz, contact the motor manufacturer to find out the maximum allowable speed of revolution.
*3 For the stable control of the motor, the output frequency may exceed the maximum frequency set in A004 (A204) by 2 Hz max.

Version Information

Unit Versions

Unit	Model	Unit version	
		Ver.1.0	Ver1.1
EtherCAT Communication Unit for MX2-Series	3G3AX-MX2-ECT	Supported	Supported
Compatible Sysmac Studio version		Version1.00 or higher*	Version1.00 or higher

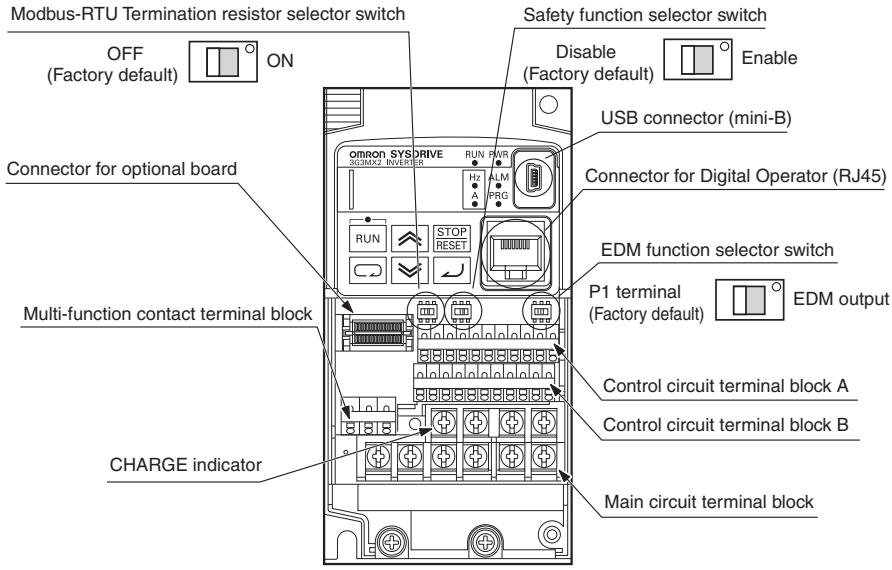
* The function that was enhanced by the upgrade for Unit version1.1 can not be used. For detail, refer to "Function Support by Unit Version".

Function Support by Unit Version

Unit / Model / Unit version / Item	Unit version 1.0	Unit version 1.1
Store-function of back-up number of parameters	Not supported	Supported
Initializing function as parameters.	Not supported	Supported

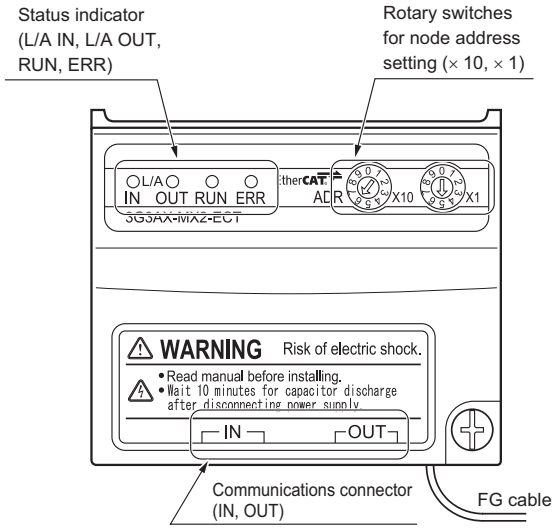
Components and Functions

Inverter 3G3MX2

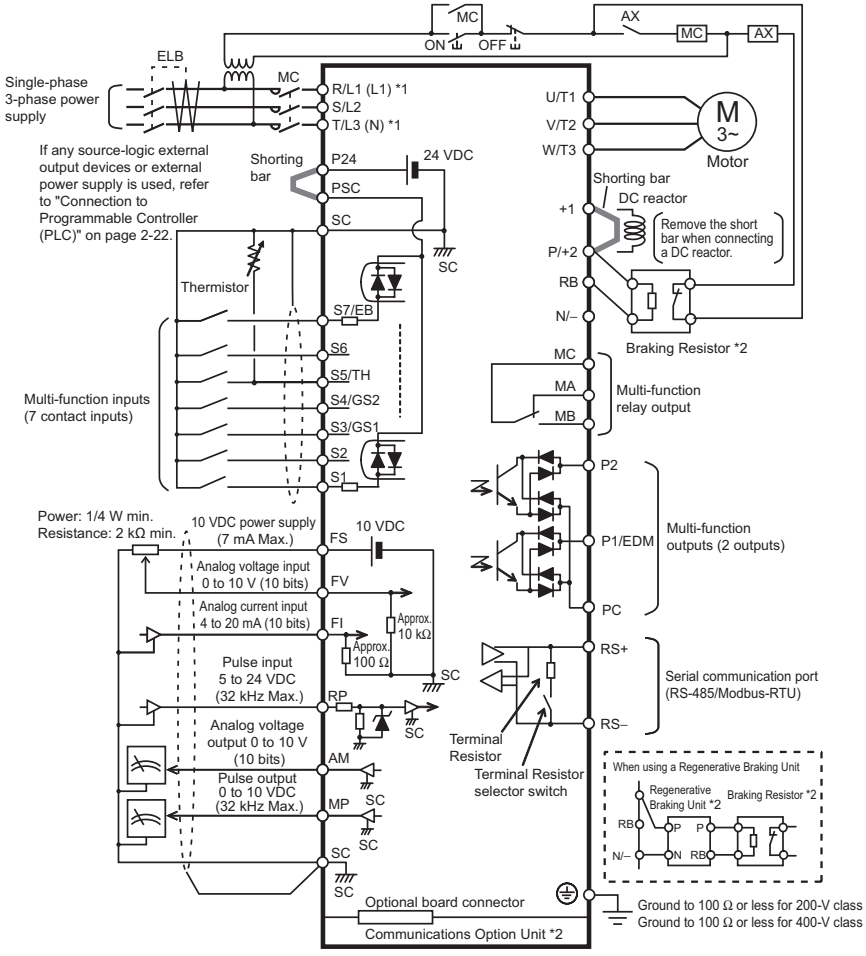


Name	Function
Modbus-RTU Termination resistor selector switch	Use this Terminal Resistor selector switch for RS-485 terminals on the control circuit terminal block. When this switch is turned ON, the internal 200 Ω Resistor is connected.
Safety function selector switch	Turn this switch ON when using the safety function. Turn OFF the power before turning this switch ON/OFF. For details, refer to USER'S MANUAL (Cat.No.I570).
EDM function selector switch	Turn this switch ON when using the EDM output of the safety function. Turn OFF the power before turning this switch ON/OFF.For details, refer to USER'S MANUAL (Cat.No.I570).
USB connector	Use this mini-B USB connector to connect a PC. Even when the Inverter is being operated by a PC, etc., via USB connection, it can still be operated using the Digital Operator.
Connector for Digital Operator	Use this connector to connect the Digital Operator.
Connector for optional board	Use this connector to mount the optional board. (Communications Units and other options can be connected.)
Control circuit terminal blocks A and B	These terminal blocks are used to connect various digital/analog input and output signals for inverter control, etc.
Multi-function contact terminal block	Use this SPDT contact terminal block for relay outputs.
Main circuit terminal block	Use this terminal block to connect an output to the motor and Braking Resistor, etc. Also, use this terminal block to connect the inverter to the main power supply.
CHARGE indicator (Charge indicator LED)	This LED indicator is lit if the DC voltage of the main circuit (between terminals P/+2 and N/-) remains approx. 45 V or above after the power has been cut off. Before wiring, etc. confirm that the Charge LED indicator is turned OFF.

EtherCAT Communication Unit 3G3AX-MX2-ECT



Connection Diagram

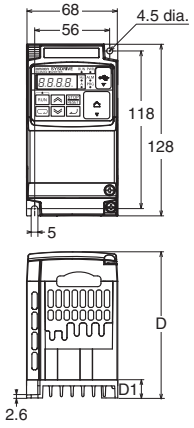


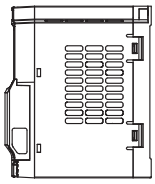
*1 Connect to terminals L1 and N on a single-phase, 200-V Inverter (3G3MX2-AB□□□).
*2 Optional.

Dimensions

(Unit: mm)

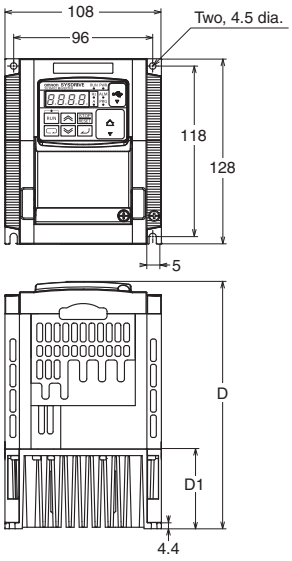
3G3MX2-AB001
3G3MX2-AB002
3G3MX2-AB004
3G3MX2-A2001
3G3MX2-A2002
3G3MX2-A2004
3G3MX2-A2007

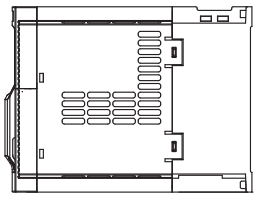




Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
1-phase 200 V	3G3MX2-AB001 3G3MX2-AB002	68	128	109	13.5
	3G3MX2-AB004			122.5	27
3-phase 200 V	3G3MX2-A2001 3G3MX2-A2002			109	13.5
	3G3MX2-A2004			122.5	27
	3G3MX2-A2007			145.5	50

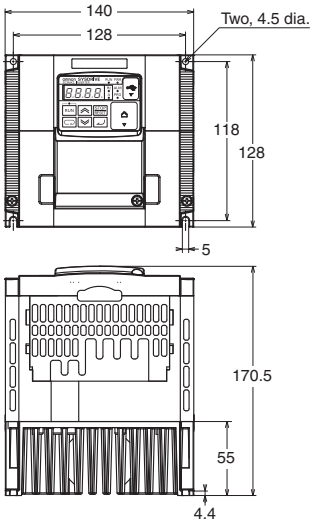
3G3MX2-AB007
3G3MX2-AB015
3G3MX2-AB022
3G3MX2-A2015
3G3MX2-A2022
3G3MX2-A4004
3G3MX2-A4007
3G3MX2-A4015
3G3MX2-A4022
3G3MX2-A4030

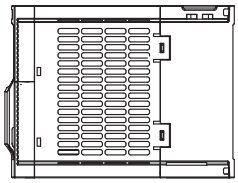




Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
1-phase 200 V	3G3MX2-AB007 3G3MX2-AB015 3G3MX2-AB022	108	128	170.5	55
3-phase 200 V	3G3MX2-A2015 3G3MX2-A2022				
	3G3MX2-A4004			143.5	28
3-phase 400 V	3G3MX2-A4007 3G3MX2-A4015 3G3MX2-A4022 3G3MX2-A4030			170.5	55

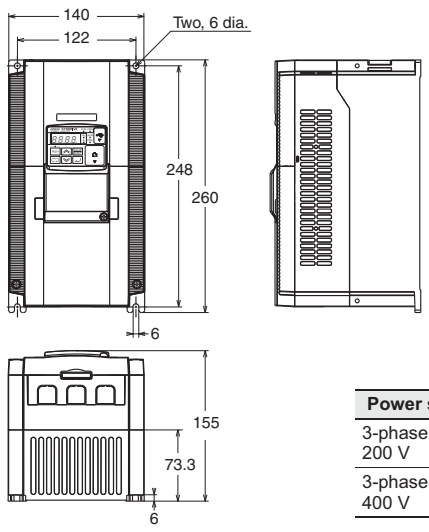
3G3MX2-A2037
3G3MX2-A4040





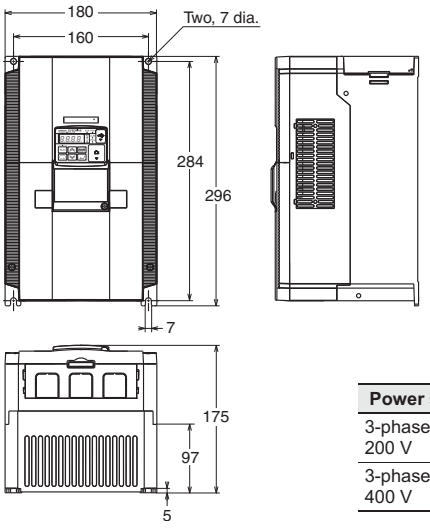
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2037	140	128	170.5	55
3-phase 400 V	3G3MX2-A4040				

3G3MX2-A2055
3G3MX2-A2075
3G3MX2-A4055
3G3MX2-A4075



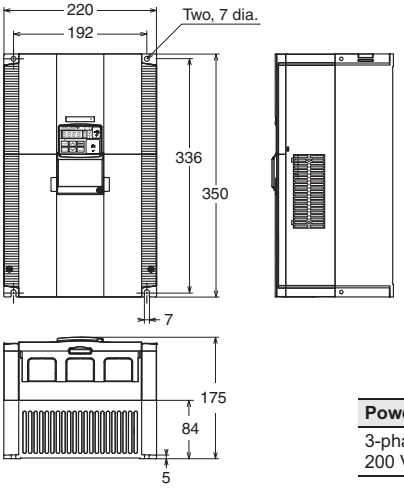
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2055 3G3MX2-A2075	140	260	155	73.3
3-phase 400 V	3G3MX2-A4055 3G3MX2-A4075				

3G3MX2-A2110
3G3MX2-A4110
3G3MX2-A4150



Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2110	180	296	175	97
3-phase 400 V	3G3MX2-A4110 3G3MX2-A4150				

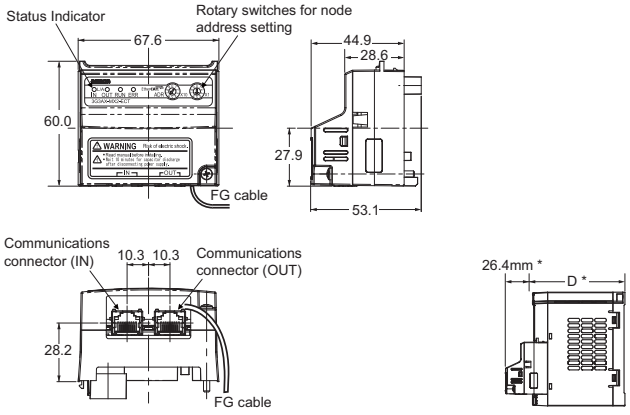
3G3MX2-A2150



Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2150	220	350	175	84

EtherCAT Communication Unit

3G3AX-MX2-ECT



* After the EtherCAT Communication Unit is installed, dimension D of the inverter increases by 26.4 mm. (Dimension D of the inverter varies depending on the capacity. Refer to the manual for the inverter.)

FQ-M-Series

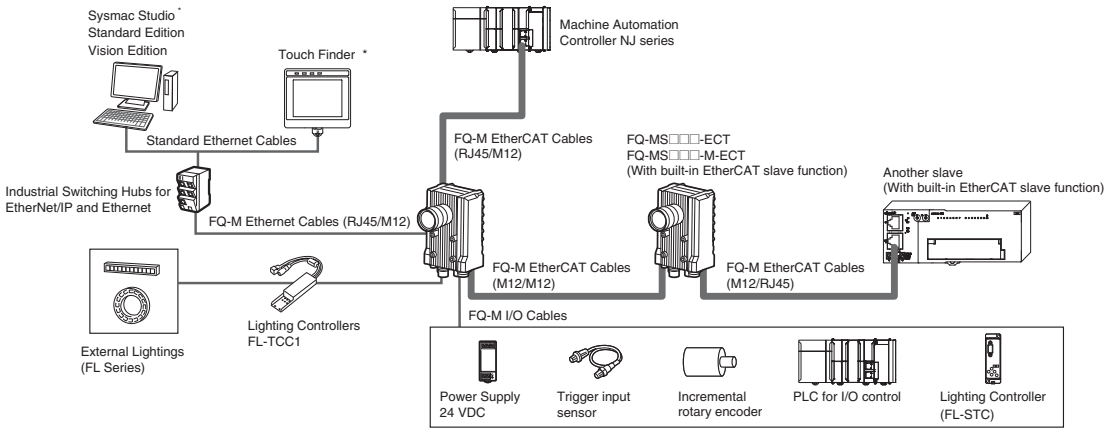
Designed for motion tracking

- Connectivity with EtherCAT/Ethernet
- Up to 5000 pieces per minute with 360 degree rotation*
- Vision sensor with encoder input for tracking function
- Calibration function of the complete system
- Flexible data output depending on the output devices

* The processing speed depends on setting conditions.

System configuration

EtherCAT connections



* Sysmac Studio and Touch Finder can not be used together. When both are connected, Sysmac Studio will have a priority.
When you use the Sysmac Studio Standard Edition and connect the FQ series and the Machine Automation Controller NJ-series, connect them with a general-purpose Ethernet cable or a USB cable.

Note: 1. EtherCAT and Ethernet (PLC Link) can not be used simultaneously.
2. It is not possible to configure and adjust the FQ-M via an NJ-series controller, when they are connected via an EtherCAT network. For configuration and adjustment of FQ-M, connect the FQ-M and a computer or a Touch Finder via an Ethernet network.

Specifications

Sensors

Item	Type	EtherCAT communication function provided	
		Color	Monochrome
Model	**NPN**	FQ-MS120-ECT	FQ-MS120-M-ECT
	PNP	FQ-MS125-ECT	FQ-MS125-M-ECT
Field of vision, Installation distance		Selecting a lens according to the field of vision and installation distance. Refer to the *"Optical Chart"* page.	
Main functions	**Inspection items**	Shape search, Search, Labeling, Edge position	
	Number of simultaneous inspections	32	
	Number of registered scenes	32	
Image input	**Image processing method**	Real color	Monochrome
	Image elements	1/3-inch color CMOS	1/3-inch monochrome CMOS
	Image filter	High dynamic range (HDR) and white balance	High dynamic range (HDR)
	Shutter	Electronic shutter; select shutter speeds from 1/10 to 1/30000 (sec)	
	Processing resolution	752 (H) × 480 (V)	
	Pixel size	6.0 (μm) × 6.0 (μm)	
	Frame rate (image read time)	60fps (16.7ms)	
External Lightings	**Connecting method**	Connection via a strobe light controller	
	Connectable lighting	FL series	
Data logging	**Measurement data**	In Sensor: Max. 32000 items *1	
	Images	In Sensor: 20 images *1	
Measurement trigger		I/O trigger, Encoder trigger, Communications trigger (Ethernet No-protocol, PLC Link, or EtherCAT)	
I/O specifications	**Input signals**	9 signals • Single measurement input (TRIG) • Error clear input (IN0) • Encoder counter reset input (IN1) • Encoder input (A±, B±, Z±) *3	
	Output signals	5 signals *2 • OUT0 Overall judgement output (OR) • OUT1 Control output (BUSY) • OUT2 Error output (ERROR) • OUT3 (Shutter output: SHTOUT) • OUT4 (Strobe trigger output: STGOUT)	
	Ethernet specifications	100BASE-TX/10BASE-TX	
	EtherCAT specifications	Dedicated protocol for EtherCAT 100BASE-TX	
	Connection method	Special connector cables • Power supply and I/O: 1 special connector I/O cable • Touch Finder, Computer and Ethernet: 1 Ethernet cable • EtherCAT: 2 EtherCAT cable	
LED display		• OR: Judgment result indicator • ERR: Error indicator • BUSY: BUSY indicator • ETN: Ethernet communications indicator	
	EtherCAT display	• L/A IN (Link/Activity IN) × 1 • L/A OUT (Link/Activity OUT) × 1 • RUN × 1 • ERR × 1	
Ratings	**Power supply voltage**	21.6 to 26.4 VDC (including ripple)	
	Insulation resistance	Between all lead wires and case: 0.5 MΩ (at 250 V)	
	Current consumption	450mA max. (When the FL-series Strobe controller and lighting are used.) 250mA max. (When external lighting is not used.)	
Environmental immunity	**Ambient temperature range**	Operating: 0 to 50 °C, Storage: -20 to 65 °C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gas	
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times	
	Shock resistance (destruction)	150 m/s^2 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	Degree of protection	IEC60529 IP40	
Materials		Case: alminium die casting, Rear cover: alminium plate	
Weight		Approx. 480 g (Sensor only)	
Accessories		Instruction Manual	

*1 If a Touch Finder is used, results can be saved up to the capacity of an SD card.
*2 The five output signals can be allocated for the judgements of individual inspection items.

*3 Encoder input specifications

Pulse input Specifications (When an open collector type encoder is used.)

Item		Specification		
Input voltage		24 VDC ±10%	12 VDC ±10%	5 VDC ±5%
Input current		4.8 mA (at 24 VDC, typical value)	2.4 mA (at 12 VDC, typical value)	1.0 mA (at 5 VDC, typical value)
NPN	ON voltage *1	4.8 V max.	2.4 V max.	1.0 V max.
	OFF voltage *2	19.2 V min.	9.6 V min.	4.0 V min.
PNP	ON voltage *1	19.2 V min.	9.6 V min.	4.0 V min.
	OFF voltage *2	4.8 V max.	2.4 V max.	1.0 V max.
Maximum response frequency *3		50 kHz (I/O cable: when the FQ-MWD005 or FQ-MWDL005 cables is used.) 20 kHz (I/O cable: when the FQ-MWD010 or FQ-MWDL010 cables is used.)		
Input impedance		5.1 kΩ		

*1 ON voltage: Voltage to change from OFF to ON state. The ON voltage is the difference of voltages between the GND terminal of the encoder power terminals and each input terminal.
*2 OFF voltage: Voltage to change from ON to OFF state. The ON voltage is the difference of voltages between the GND terminal of the encoder power terminals and each input terminal.
*3 Select maximum response frequency depending on length of the encoder cable and response frequency of the encoder.

Pulse input Specifications (When a line-driver output type encoder is used.)

Item	Specification
Input voltage	EIA standard RS-422-A line driver level
Input impedance *1	120 Ω ±5%
Differential input voltage	0.2 V min.
Hysteresis voltage	50 mV
Maximum response frequency *2	200 kHz (I/O cable: when the FQ-MWD005, FQ-MWDL005, FQ-MWD010, or FQ-MWDL010 cables is used.)

*1 When terminating resistance function is used.
*2 Select maximum response frequency depending on length of the encoder cable and response frequency of the encoder.

Touch Finder

Item			Type	Model with DC power supply	Model with AC/DC/battery power supply
			Model	FQ-MD30	FQ-MD31
Number of connectable Sensors				2 max.	
Main functions	Types of measurement displays			Last result display, Last NG display, trend monitor, histograms	
	Types of display images			Through, frozen, zoom-in, and zoom-out images	
	Data logging			Measurement results, measured images	
	Menu language			English, Japanese	
Indications	LCD	Display device		3.5-inch TFT color LCD	
		Pixels		320 × 240	
		Display colors		16,777,216	
	Backlight	Life expectancy *1		50,000 hours at 25 °C	
		Brightness adjustment		Provided	
		Screen saver		Provided	
	Indicators	Power indicator (color: green)		POWER	
		Error indicator (color: red)		ERROR	
		SD card access indicator (color: yellow)		SD ACCESS	
		Charge indicator (color: orange)		---	CHARGE
Operation interface	Touch screen	Method		Resistance film	
		Life expectancy *2		1,000,000 operations	
External interface	Ethernet			100 BASE-TX/10 BASE-T	
	SD card			Omron SD card (Model: HMC-SD291) or a SDHC card of Class4 or higher rating is recommended.	
Ratings	Power supply voltage	DC power connection		20.4 to 26.4 VDC (including ripple)	
		AC adapter connection		---	100 to 240 VAC, 50/60 Hz
		Battery connection		---	FQ-BAT1 Battery (1 cell, 3.7 V)
	Continuous operation on Battery *3			---	1.5 h
	Current consumption			DC power connection: 0.2 A	
	Insulation resistance			Between all lead wires and case: 0.5 MΩ (at 250 V)	
Environmental immunity	Ambient temperature range			Operating: 0 to 50 °C Storage: -25 to 65 °C (with no icing or condensation)	Operating: 0 to 50 °C when mounted to DIN Track or panel 0 to 40 °C when operated on a Battery Storage: -25 to 65 °C (with no icing or condensation)
	Ambient humidity range			Operating and storage: 35% to 85% (with no condensation)	

Item	Type	Model with DC power supply	Model with AC/DC/battery power supply
	Model	FQ-MD30	FQ-MD31
Environmental immunity	Ambient atmosphere	No corrosive gas	
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times	
	Shock resistance (destruction)	150 m/s^2 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	Degree of protection	IEC 60529 IP20	
Dimensions		95 × 85 × 33 mm	
Materials		Case: ABS	
Weight		Approx. 270 g (without Battery and hand strap)	
Accessories		Touch Pen (FQ-XT), Instruction Manual	

*1 This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. No guarantee is implied. The life of the backlight is greatly affected by the ambient temperature and humidity. It will be shorter at lower or higher temperatures.
*2 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.
*3 This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Battery Specifications

Item / Model	FQ-BAT1
Battery type	Secondary lithium ion battery
Nominal capacity	1800 mAh
Rated voltage	3.7 V
Dimensions	35.3 × 53.1 × 11.4 mm
Ambient temperature range	Operating: 0 to 40 °C Storage: -25 to 65 °C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
Charging method	Charged in Touch Finder (FQ-MD31). AC adapter (FQ-AC□) is required.
Charging time *1	2.0 h
Battery backup life *2	300 charging cycles
Weight	50 g max.

*1 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.
*2 This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied.The value will be affected by the operating environment and operating conditions.

FQ-M Series EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connector	M12 × 2 E-CAT IN : EtherCAT (IN) E-CAT OUT : EtherCAT (OUT)
Communications media	Use the cables for FQ-MWN□□, or FQ-WN□□ series.
Communications distance	Use the communication cable within the length of FQ-MWN□□ or FQ-WN□□ series cables.
Process data	Variable PDO Mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization with DC mode 1
LED display	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1

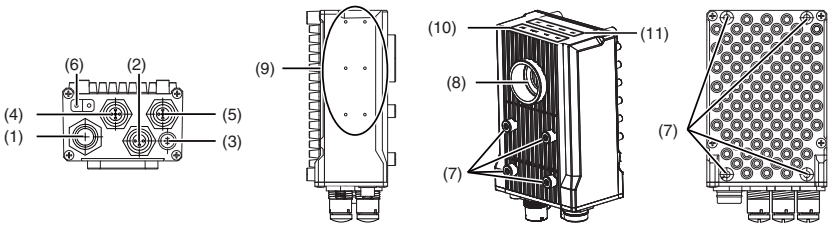
Version Information

FQ-M Series and Programming Devices

FQ-M Series	Required Programming Device	
	Sysmac Studio Standard Edition/Vision Edition	
	Ver.1.00	Ver.1.01 or higher
FQ-MS□□□(-M)-ECT	Not supported	Supported

Components and Functions

Sensor

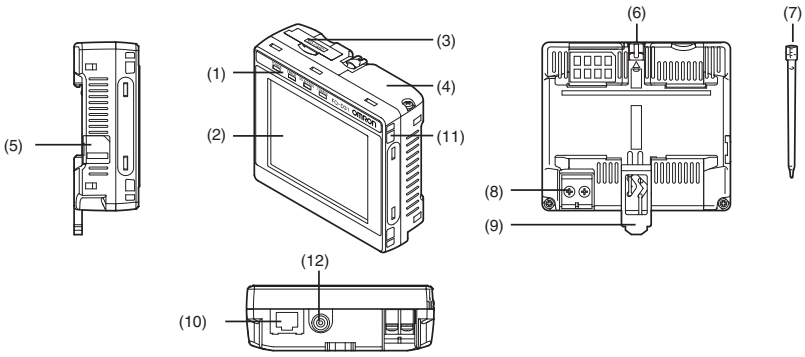


No.	Name	Description
(1)	I/O Cable connector	An I/O Cable is used to connect the Sensor to the power supply and external I/O.
(2)	Ethernet connector	An Ethernet cable is used to connect the Sensor to external devices such as PLCs, the Touch Finder, or computers.
(3)	Lighting connector	Connect an external lighting (strobe controller).
(4)	EtherCAT connector (IN)*	Connect an EtherCAT compatible device.
(5)	EtherCAT connector (OUT)*	Connect an EtherCAT compatible device.
(6)	Node address switch *	Set the node address for EtherCAT communications.
(7)	Installation holes	Holes to install and secure the camera.
(8)	C-mount lens connection part	Install the C-mount lens in this part. Determine the field of view depending on the measurement target and select a suitable CCTV lens (C-mounting lens).

No.	Name		Description
(9)	Strobe controller connection holes		Install the strobe controller in this part. FL-TCC1 can be mounted.
(10)	Measurement process Operation indicators	OR	Lit in orange while OR signal is ON.
		ETN	Lit in orange while in Ethernet communications.
		ERROR	Lit in red when an error occurs.
		BUSY	Lit in green while the sensor is processing.
(11)	EtherCAT Operation indicators	L/A IN	Lit in green when Link with EtherCAT device is established and flickers in green when communicating (data IN).
		L/A OUT	Lit in green when Link with EtherCAT device is established and flickers in green when communicating (data OUT).
		ECAT RUN	Lit in green when EtherCAT communication is available.
		ECAT ERROR	Lit in red when an EtherCAT communications error occurs.

* FQ-MS□□□-ECT and FQ-MS□□□-M-ECT only.

Touch Finder



No.	Name		Description
(1)	Operation indicators	POWER	Lights green when the Touch Finder is turned ON.
		ERROR	Lights red when an error occurs.
		SD ACCESS	Lights yellow when an SD card is inserted. Flashes yellow when the SD card is being accessed.
		CHARGE *	Lights orange when the Battery is charging.
(2)	LCD/touch panel		Displays the setting menu, measurement results, and images input by the camera.
(3)	SD card slot		An SD card can be inserted.
(4)	Battery cover *		The Battery is inserted behind this cover. Remove the cover when mounting or removing the Battery.
(5)	Power supply switch		The Battery is inserted behind this cover. Remove the cover when mounting or removing the Battery.

No.	Name	Description
(6)	Touch pen holder	The touch pen can be stored here when it is not being used.
(7)	Touch pen	Used to operate the touch panel.
(8)	DC power supply connector	Used to connect a DC power supply.
(9)	Slider	Used to mount the Touch Finder to a DIN Track.
(10)	Ethernet port	Used when connecting the Touch Finder to the Sensor with an Ethernet cable. Insert the connector until it locks in place.
(11)	Strap holder	This is a holder for attaching the strap.
(12)	AC power supply connector *	Used to connect the AC adapter.

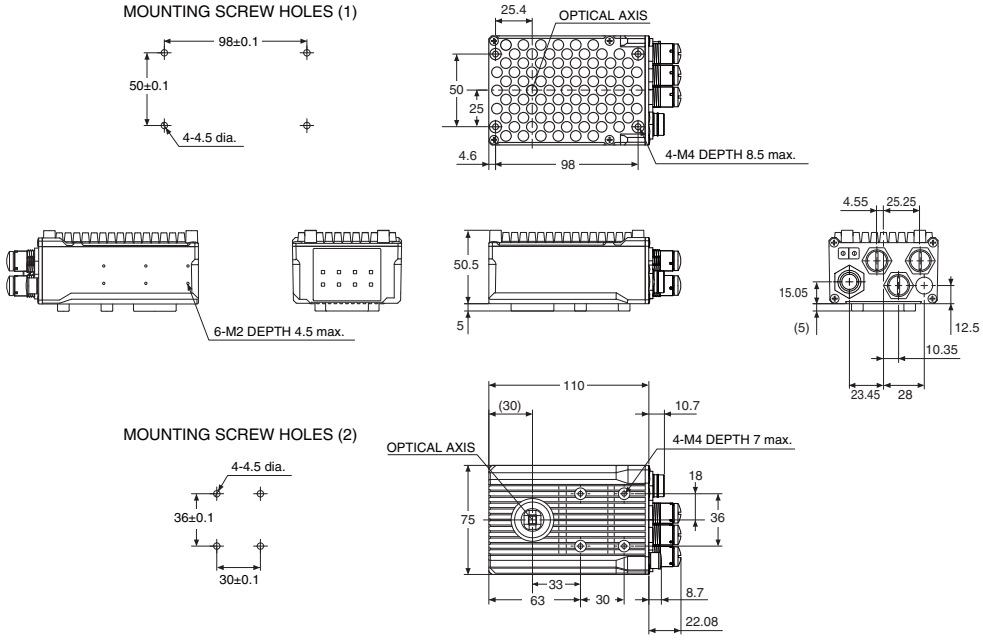
* Applicable to the FQ-MD31 only.

Dimensions

(Unit: mm)

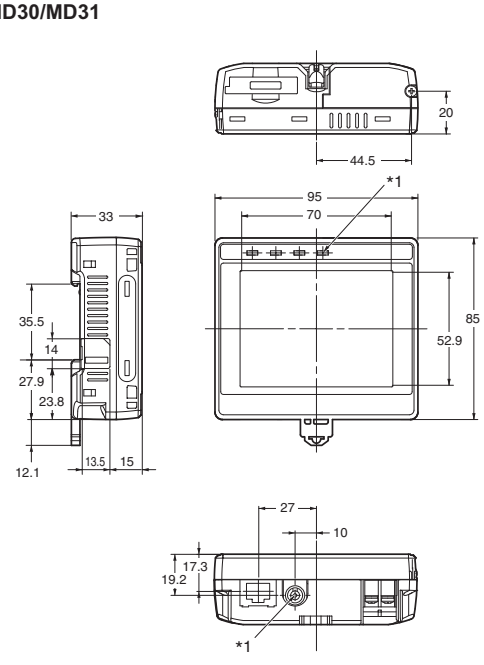
Sensor

FQ-MS120-ECT/MS120-M-ECT
FQ-MS125-ECT/MS125-M-ECT

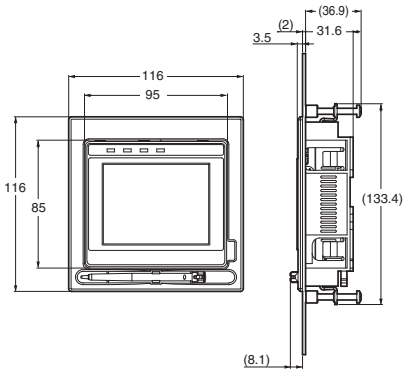


Touch Finder

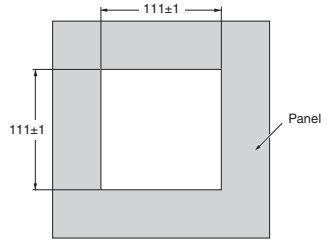
FQ-MD30/MD31



Panel Mounting Adapter *2



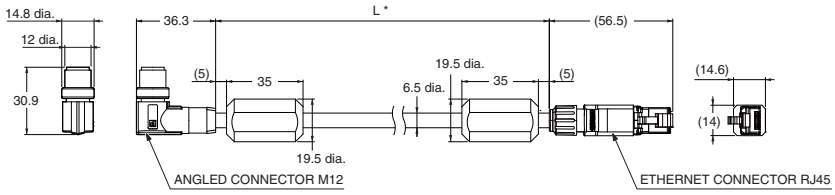
Panel Cutout Dimensions



*1 Provided with FQ-MD31 only.
*2 The dimension of the panel mounting adapter does not include that of a FQ-MD□□.

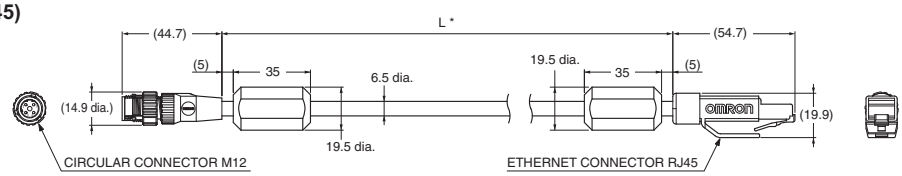
Cables

- **For EtherCAT and Ethernet cable**
  Angle:M12/ Straight:RJ45
  FQ-MWNL005/010



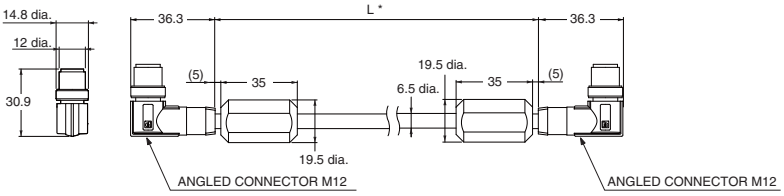
* Cable is available in 5 m/10 m.

Straight type (M12/RJ45)
FQ-WN005/010



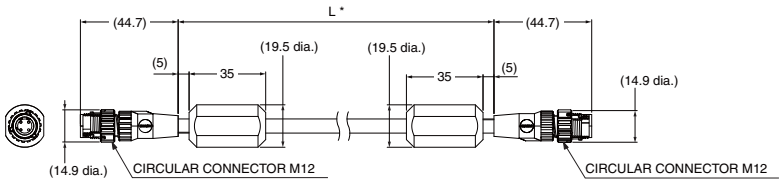
* Cable is available in 5 m/10 m.

- **For EtherCAT cable**
  Angle type (M12/M12)
  FQ-MWNEL005/010



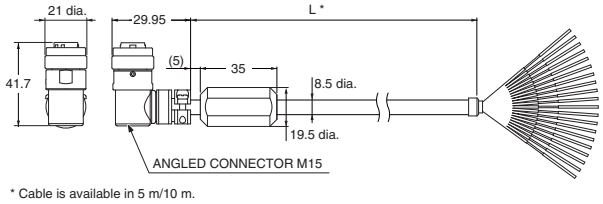
* Cable is available in 5 m/10 m.

Straight type (M12/M12)
FQ-MWNE005/010



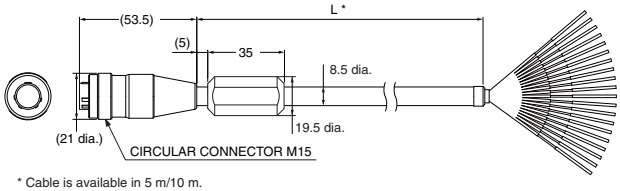
* Cable is available in 5 m/10 m.

- **I/O Cables**
  Angle type
  FQ-MWDL005/010



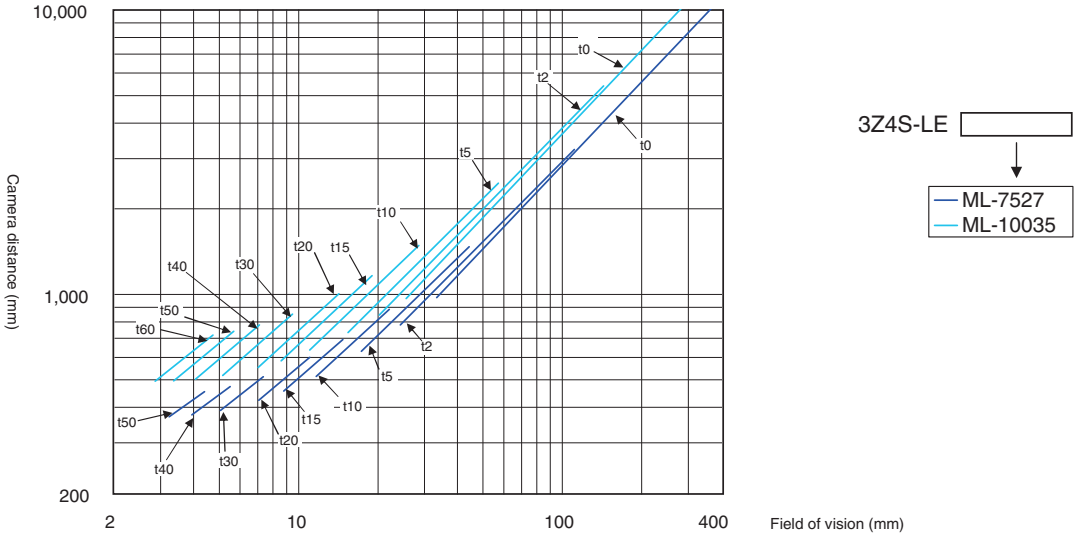
* Cable is available in 5 m/10 m.

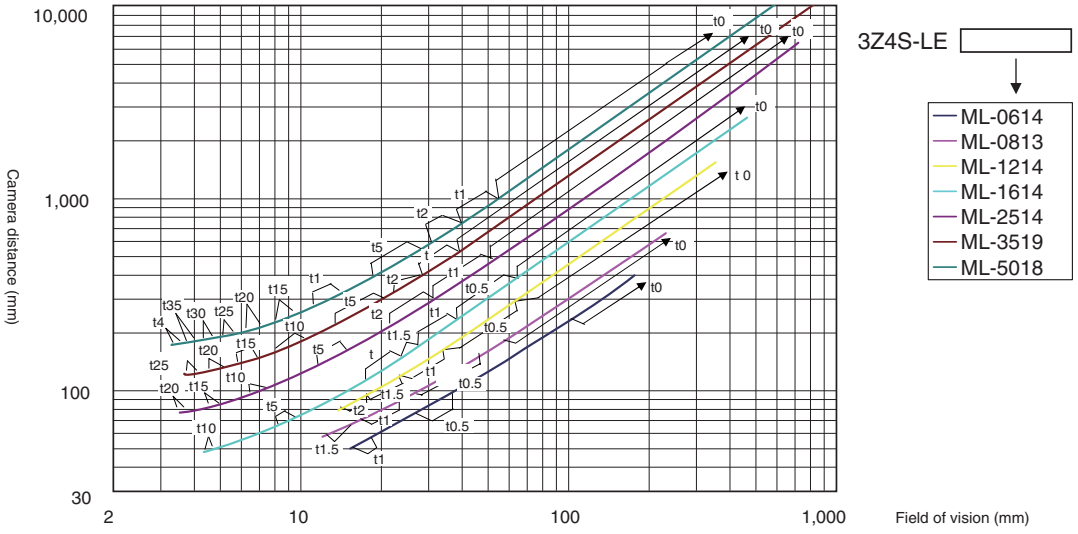
Straight type
FQ-MWD005/010



* Cable is available in 5 m/10 m.

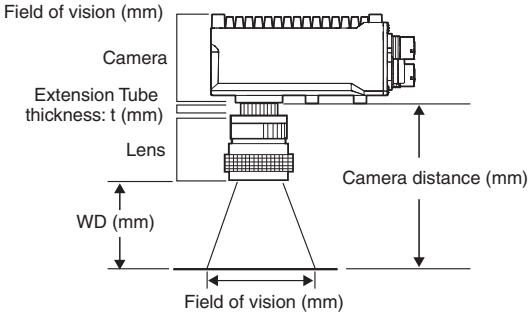
Optical Chart

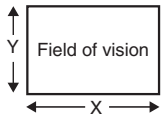




Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) *1,
and the Y axis of the optical chart shows the camera installation distance (mm).*2





*1. The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.
*2. The vertical axis represents WD for small cameras.

GX-Series

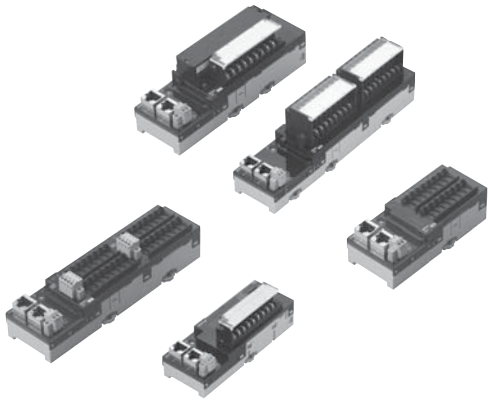
Realizes high-speed communication to match a variety of applications

• Digital I/O Terminals
Inputs/Outputs the digital ON/OFF signals.

• Analog I/O Terminals
Inputs/Outputs the analog signal of 0-5V or 4-20mA, etc., and executes A/D or D/A conversion.

• Encoder Input Terminal
Performs conversion for pulse input signals from an encoder.

• Expansion Units
Attached to the Digital I/O Unit to expands the I/O points.
Can be attached to a two-tier terminal block type with 16 inputs, 16 outputs, and 16 relay outputs.



General Specifications

It is common specifications of EtherCAT Remote I/O Terminal GX-Series. Refer to the pages of specifications for individual I/O terminals for details.

Item	Specification
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC –15% to +10%)
I/O power supply voltage	20.4 to 26.4 VDC (24 VDC –15% to +10%)
Noise resistance	Conforms to IEC 61000-4-4, 2 kV (power line)
Vibration resistance	Malfunction 10 to 60 Hz with amplitude of 0.7 mm, 60 to 150Hz and 50 m/s^2 in X, Y, and Z directions for 80 minutes <Relay Output Unit GX-OC1601 only> 10 to 55 Hz with double-amplitude of 0.7 mm
Impact resistance	150 m/s^2 with amplitude of 0.7 mm <Relay Output Unit GX-OC1601 only> 100 m/s^2 (3 times each in 6 directions on 3 axes)
Dielectric strength	600 VAC (between isolated circuits)
Isolation resistance	20 MΩ or more (between isolated circuits)
Ambient operating temperature	–10 to 55 °C
Operating humidity	25% to 85% (with no condensation)
Operating atmosphere	No corrosive gases
Storage temperature	–25 to 65 °C
Storage humidity	25% to 85% (with no condensation)
Terminal block screws tightening torque *	M3 wiring screws: 0.5 N•m M3 terminal block mounting screws: 0.5 N•m
Mounting method	35-mm DIN track mounting

* Applicable only to 2-tier terminal block and 3-tier terminal block type slaves.

EtherCAT Communications Specifications

Communications Specifications of GX-Series EtherCAT Remote I/O Terminal

Item	Specification
Communication protocol	Dedicated protocol for EtherCAT
Modulation	Base band
Baud rate	100 Mbps
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 shielded connector × 2 CN IN: EtherCAT input CN OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding is recommended.)
Communications distance	Distance between nodes (slaves): 100 m max.
Noise resistance	Conforms to IEC 61000-4-4, 1 kV or higher
Node address setting method	Set with decimal rotary switch or Sysmac Studio
Node address range	1 to 99: Set with rotary switch 1 to 65535: Set with Sysmac Studio
LED display	PWR × 1 L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
Process data	Fixed PDO mapping
PDO size/node	2 bit to 256 byte
Mailbox	Emergency messages, SDO requests, SDO responses, and SDO information
SYNCHRONIZATION mode	Digital I/O Slave Unit and Analog I/O Slave Unit: Free Run mode (asynchronous) Encoder Input Slave Unit: DC mode 1

Version Information

Unit Versions

Units	Models	Unit Version	
		Unit version 1.0	Unit version 1.1
GX-Series EtherCAT Slave Units	GX-□□□□□□	Supported	Supported
Compatible Sysmac Studio version		Version1.00 or higher*	Version1.00 or higher

* The function that was enhanced by the upgrade for Unit version1.1 can not be used. For detail, refer to "Function Support by Unit Version".

Function Support by Unit Version

The following tables show the relationship between unit versions and CX-Programmer versions.

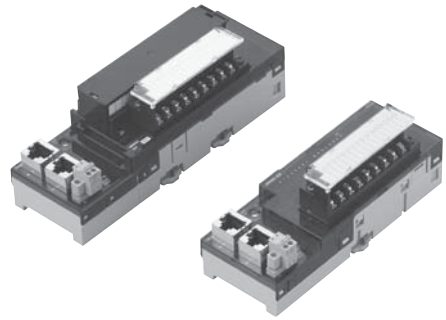
Unit Versions and Programming Devices

Unit	GX-Series EtherCAT Slave Units	
Model	GX-□□□□□□	
Item \ Unit version	Unit version 1.0	Unit version 1.1
Sysmac error status	No Supported	Supported
Save the node address setting	No Supported	Supported
Serial Number Display	No Supported	Supported
ESI standard (1.0)	Supported	Supported
SII data check	No Supported	Supported

Digital I/O Terminal 2-tier Terminal Block Type

GX-□D16□1/OC1601

High-speed digital I/O terminal with the screw type terminal block for EtherCAT communications



- Detachable screw terminal block facilitates the maintenance.
- The expansion unit can be connected.
  (One expansion unit per one I/O terminal unit.)
  Input/output point can be flexibly increased depending on the system.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

Expansion Units

One Expansion Unit can be combined with one Digital I/O Terminal (GX-ID16□1/OD16□1/OC1601). The following Expansion Units are available. They can be combined in various ways for flexible I/O capacity expansion.

Model	I/O points	Input capacity	Output capacity
XWT-ID08	8 DC inputs (NPN)	8	0
XWT-ID08-1	8 DC inputs (PNP)	8	0
XWT-OD08	8 transistor outputs (NPN)	0	8
XWT-OD08-1	8 transistor outputs (PNP)	0	8
XWT-ID16	16 DC inputs (NPN)	16	0
XWT-ID16-1	16 DC inputs (PNP)	16	0
XWT-OD16	16 transistor outputs (NPN)	0	16
XWT-OD16-1	16 transistor outputs (PNP)	0	16

General Specifications

For Common Specifications of I/O terminals, refer to page 99.

Input Section Specifications

16-point Input Terminals

Item	Specification	
	GX-ID1611	GX-ID1621
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 inputs/common	
Input indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	180 g max.	
Expansion functions	Enabled	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Output Section Specifications

16-point Output Terminals

Item	Specification	
	GX-OD1611	GX-OD1621
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	180 g max.	
Expansion functions	Enabled	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Relay 16-point Output Terminals

Item	Specification
	GX-OC1601
Output capacity	16 points
Mounted relays	NY-5W-K-IE (Fujitsu Component) *
Rated load	Resistance load 250 VAC 2 A/output, common 8 A 30 VDC 2 A/output, common 8 A
Rated ON current	3 A/output
Maximum contact voltage	250 VAC, 125 VDC
Maximum contact current	3 A/output
Maximum switching capacity	750 VAAC, 90 WDC
Minimum applicable load (reference value)	5 VDC 1mA
Mechanical service life	20,000,000 operations min.
Electrical service life	100,000 operations min.
Number of circuits per common	16 points/common
Output indicators	LED display (yellow)
Isolation method	Relay isolation
I/O power supply method	The relay drive power is supplied from the unit power supply.
Unit power supply current consumption	210 mA max. (for 20.4 to 26.4-VDC power supply voltage)
Weight	290 g max.
Expansion functions	Enabled
Output handling for communications errors	Select either hold or clear
Short-circuit protection function	No

* For the specification of individual relay, refer to the data sheet of published by manufacturers.

Precautions for Correct Use

- With a current of between 2 and 3 A (8 to 10 A per common), either ensure that the number of points per common that simultaneously turn ON does not exceed 4 or ensure that the ambient temperature does not exceed 45 °C. Also, there are no restrictions if the current does not exceed 2 A (8 A per common).
- The rated current is the value for assuring normal operation, and not for assuring durability of the relays. The relay service life depends greatly on factors such as the operating temperature, the type of load, and switching conditions. The actual equipment must be checked under actual operating conditions.

Input and Output Section Specifications

8-point Input and 8-point output Terminals

General Specifications

Item	Specification	
	GX-MD1611	GX-MD1621
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	80 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	190 g max.	
Expansion functions	No	
Short-circuit protection function	No	

Input Section

Item	Specification	
	GX-MD1611	GX-MD1621
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

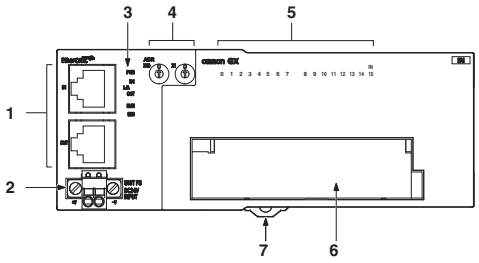
Output Section

Item	Specification	
	GX-MD1611	GX-MD1621
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

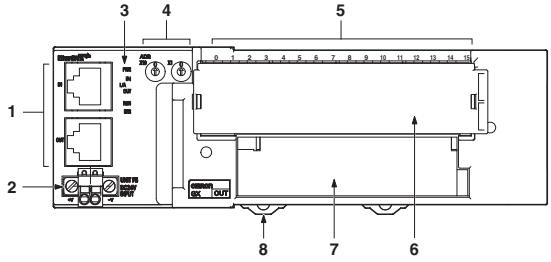
Components and Functions

16 Inputs Terminal GX-ID1611/ID1621
16 Outputs Terminal GX-OD1611/OD1621



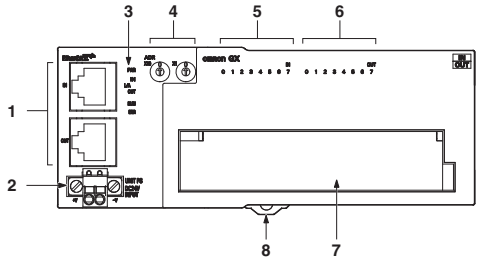
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input terminal: Input indicator (0 to 15) Output terminal: Output indicator (0 to 15)	Indicates the state of input/output contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state) Output terminal: Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	Terminal Block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Input terminals
7	DIN track mounting hook	Fixes a slave to a DIN track.

Relay 16-point Output Terminals GX-OC1601



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output Relay	Turn ON/OFF the contacts.
7	Terminal Block	Connects external devices and the I/O power supply. COM0, COM1: Common terminals 0 to 15: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

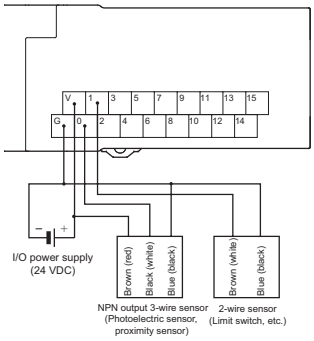
8 Inputs Terminal / 8 Outputs Terminal GX-MD1611/MD1621



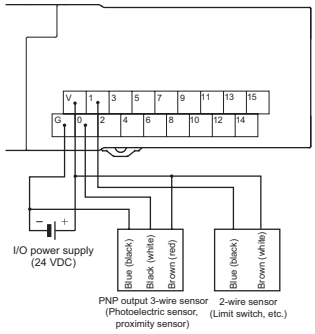
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: Input I/O terminals 0 to 7: Input terminals <Right side> V2, G2: Output I/O terminals 0 to 7: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

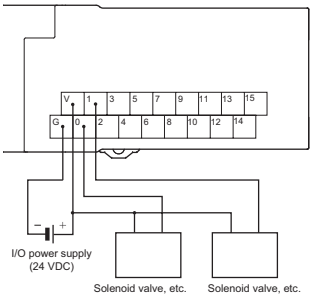
GX-ID1611 (NPN)


V 1 3 5 7 9 11 13 15
G 0 2 4 6 8 10 12 14
I/O power supply (24 VDC)
Brown (red)
Black (white)
Blue (black)
Brown (white)
Blue (black)
NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)
2-wire sensor (Limit switch, etc.)

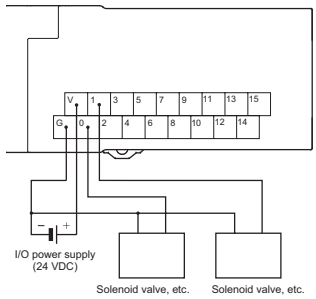
GX-ID1621 (PNP)


V 1 3 5 7 9 11 13 15
G 0 2 4 6 8 10 12 14
I/O power supply (24 VDC)
Blue (black)
Black (white)
Brown (red)
Blue (black)
Brown (white)
PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)
2-wire sensor (Limit switch, etc.)

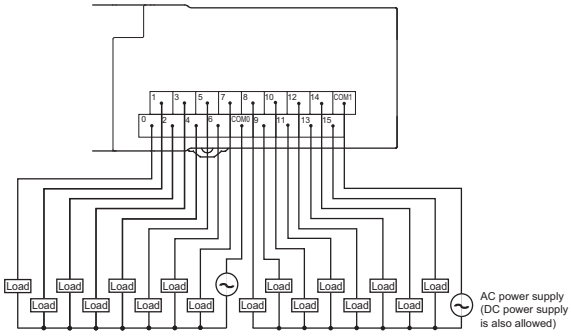
GX-OD1611 (NPN)



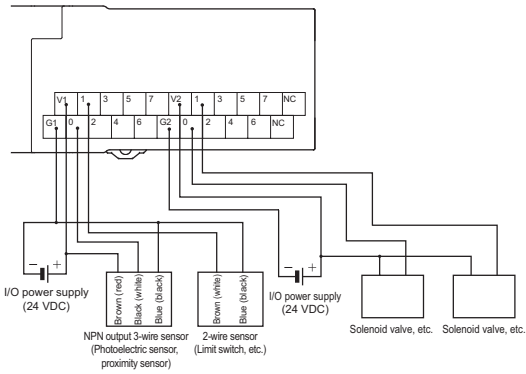
GX-OD1621 (PNP)



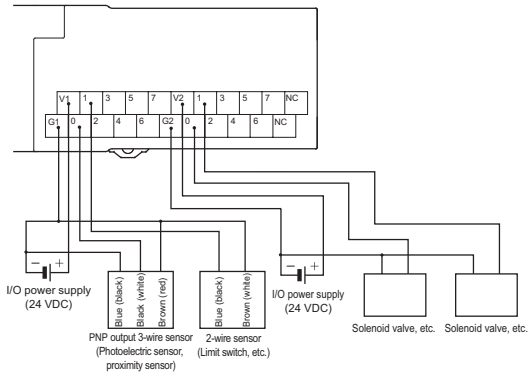
GX-OC1601



GX-MD1611 (NPN)


V1 1 3 5 7 V2 1 3 5 7 NC
G1 0 2 4 6 G2 0 2 4 6 NC
I/O power supply (24 VDC)
I/O power supply (24 VDC)
Brown (red)
Black (white)
Blue (black)
Brown (white)
Blue (black)
NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)
2-wire sensor (Limit switch, etc.)
Solenoid valve, etc.
Solenoid valve, etc.

GX-MD1621 (PNP)

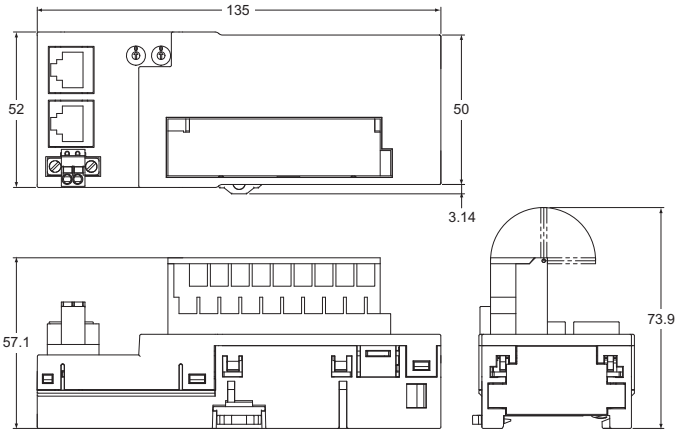

V1 1 3 5 7 V2 1 3 5 7 NC
G1 0 2 4 6 G2 0 2 4 6 NC
I/O power supply (24 VDC)
I/O power supply (24 VDC)
Blue (black)
Black (white)
Brown (red)
Blue (black)
Brown (white)
PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)
2-wire sensor (Limit switch, etc.)
Solenoid valve, etc.
Solenoid valve, etc.

Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

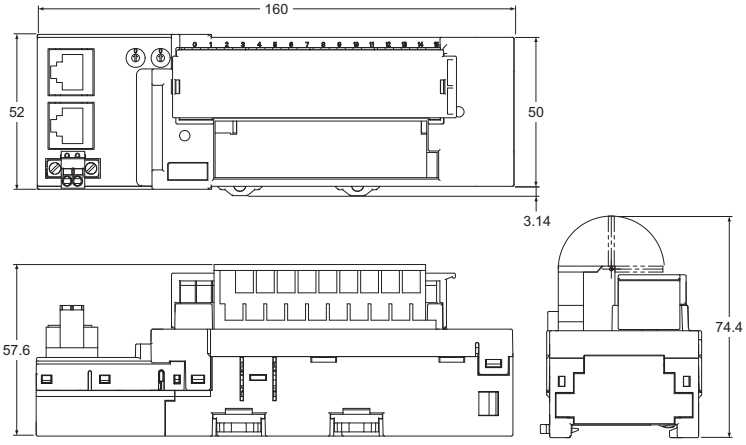
Dimensions

(Unit: mm)

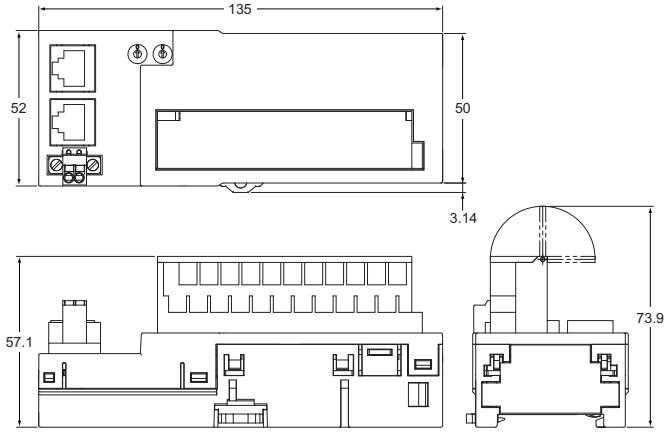
GX-ID1611/ID1621
GX-OD1611/OD1621



GX-OC1601



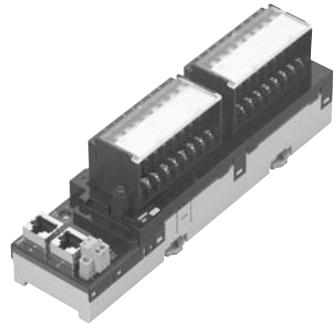
GX-MD1611/MD1621



Digital I/O Terminal 3-tier Terminal Block Type

GX-ID16□2/OD16□2/MD16□2

A common terminal is provided for each contact.
It eliminate the needs for relay terminal blocks



- It is unnecessary to share the common terminal among multiple contacts.
  Easy-to-find wiring locations.
- Detachable screw terminal block facilitates the maintenance.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

General Specifications

For Common Specifications of I/O terminals, refer to page 99.

Input Section Specifications

16-point Input Terminals

Item	Specification	
	GX-ID1612	GX-ID1622
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Input indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Input device supply current	100 mA/point	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Output Section Specifications

16-point Output Terminals

Item	Specification	
	GX-OD1612	GX-OD1622
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Input and Output Section Specifications

8-point Input and 8-point output Terminals

General Specifications

Item	Specification	
	GX-MD1612	GX-MD1622
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Short-circuit protection function	No	

Input Section

Item	Specification	
	GX-MD1612	GX-MD1622
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max./input	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Input device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

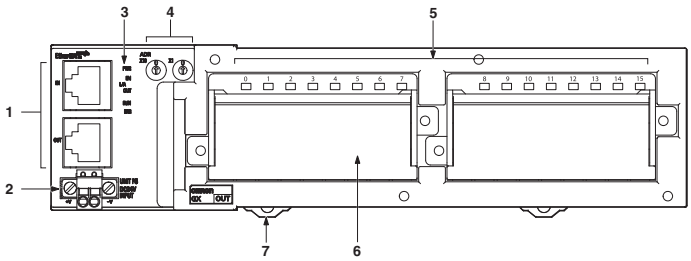
Output Section

Item	Specification	
	GX-MD1612	GX-MD1622
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX-Series Operation Manual (Cat. No. W488).

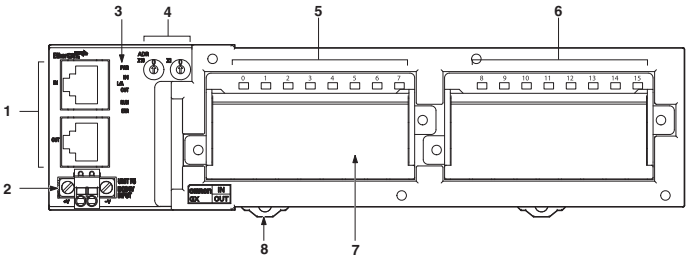
Components and Functions

16 Inputs Terminal GX-ID1612/ID1622
16 Outputs Terminal GX-OD1612/OD1622



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input terminal: Input indicator (0 to 15) Output terminal: Output indicator (0 to 15)	Indicates the state of input/output contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state) Output terminal: Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: I/O power supply terminals 0 to 7: Output terminals <Right side> V2, G2: I/O power supply terminals 8 to 15: Input terminals (Output terminals)
7	DIN track mounting hook	Fixes a slave to a DIN track.

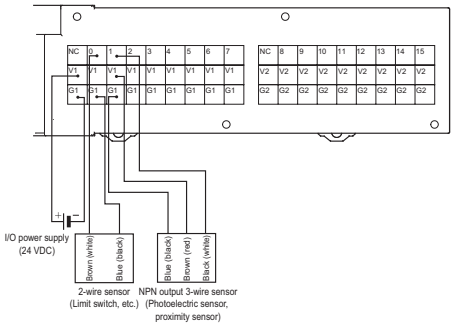
8 Inputs Terminal / 8 Outputs Terminal GX-MD1612/MD1622



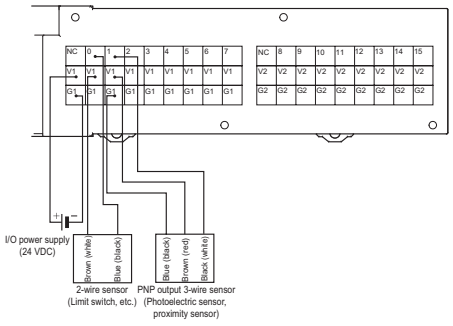
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: Input I/O puwer supply terminals 0 to 7: Input terminals <Right side> V2, G2: Output I/O power supply terminals 0 to 7: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

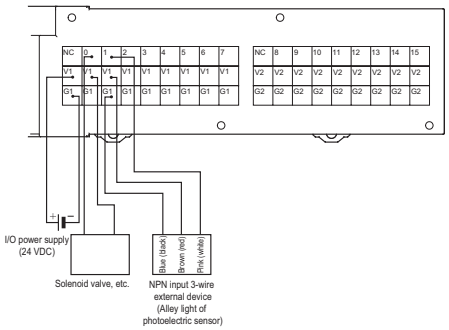
GX-ID1612 (NPN)



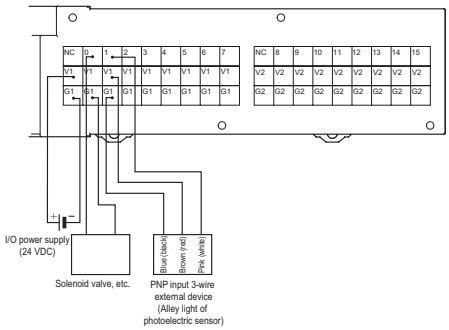
GX-ID1622 (PNP)



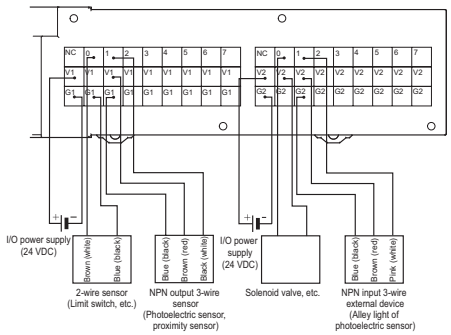
GX-OD1612 (NPN)



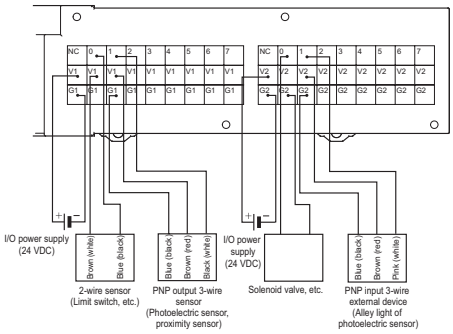
GX-OD1622 (PNP)



GX-MD1612 (NPN)



GX-MD1622 (PNP)

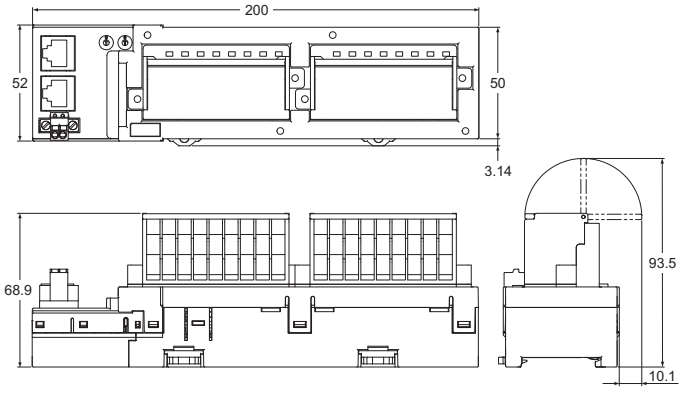


Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors.
The colors in parentheses are the wire colors prior to the revisions.

Dimensions

(Unit: mm)

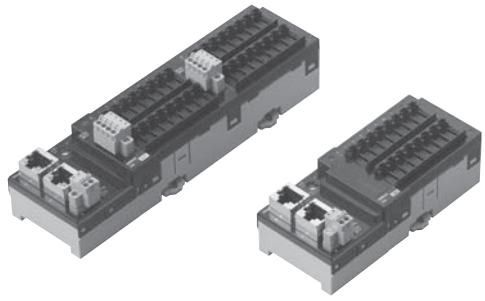
GX-ID1612/ID1622
GX-OD1612/OD1622
GX-MD1612/MD1622



Digital I/O Terminal e-CON Connector Type

GX-□D16□8/□D32□8

Easy wiring using industry standard e-CON connectors. Special wiring tool is not necessary



- Digital I/O terminal with industry standard e-CON connectors.
- A common terminal is provided for each connector.
  The I/O terminal and the sensors can be connected directly.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

General Specifications

For Common Specifications of I/O terminals, refer to page 99.

Input Section Specifications

16-point Input Terminals

Item	Specification	
	GX-ID1618	GX-ID1628
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 points/common	
Input indicators	LED display (yellow)	
Isolation method	No isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
Unit power supply current consumption	150 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	140 g max.	
Expansion functions	No	
Short-circuit protection function	Available (Operates at 50 mA/point min.)	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

32-point Input Terminals

Item	Specification	
	GX-ID3218	GX-ID3228
Input capacity	32 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	32 points/common	
Input indicators	LED display (yellow)	
Isolation method	No isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
Unit power supply current consumption	230 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	220 g max.	
Expansion functions	No	
Short-circuit protection function	Available (Operates at 50 mA/point min.)	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Output Section Specifications

16-point Output Terminals

Item	Specification	
	GX-OD1618	GX-OD1628
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	80 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	130 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

32-point Output Terminals

Item	Specification	
	GX-OD3218	GX-OD3228
Output capacity	32 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	100 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	210 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Input and Output Section Specifications

8-point Input and 8-point output Terminals

General Specifications

Item	Specification	
	GX-MD1618	GX-MD1628
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	120 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	140 g max.	
Expansion functions	No	
Short-circuit protection function	Available at input section only (Operates at 50 mA/point min.)	

Input Section

Item	Specification	
	GX-MD1618	GX-MD1628
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	No-isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

Output Section

Item	Specification	
	GX-MD1618	GX-MD1628
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

16-point Input and 16-point output Terminals

General Specifications

Item	Specification	
	GX-MD3218	GX-MD3228
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	140 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	220 g max.	
Expansion functions	No	
Short-circuit protection function	Available at input section only (Operates at 50 mA/point min.)	

Input Section

Item	Specification	
	GX-MD3218	GX-MD3228
Input capacity	16 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 points/common	
Isolation method	No-isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

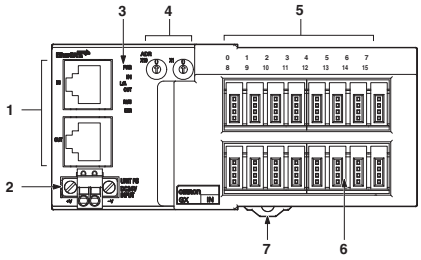
Output Section

Item	Specification	
	GX-MD3218	GX-MD3228
Output capacity	16 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

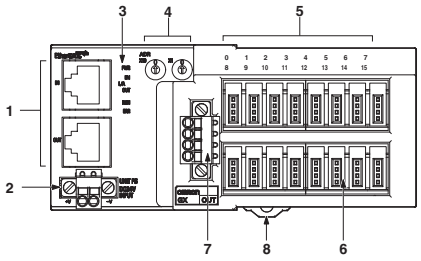
Components and Functions

16 Inputs Terminal GX-ID1618/ID1628



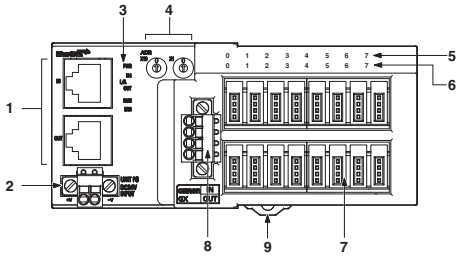
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	I/O connector (0 to 15)	Connects an external device.
7	DIN track mounting hook	Fixes a slave to a DIN track.

16 Outputs Terminal GX-OD1618/OD1628



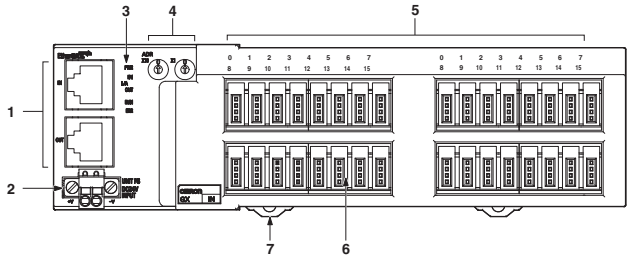
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	I/O connector (0 to 15)	Connects an external device.
7	I/O power supply connector	Supplies the I/O power.
8	DIN track mounting hook	Fixes a slave to a DIN track.

8 Inputs/8 Outputs Terminal GX-MD1618/MD1628



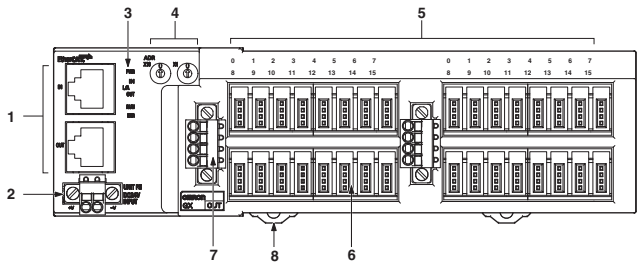
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	I/O connector (0 to 15)	Connects an external device. <Top side> For input device <Bottom side> For output device
8	I/O power supply connector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

32 Inputs Terminal GX-ID3218/ID3228



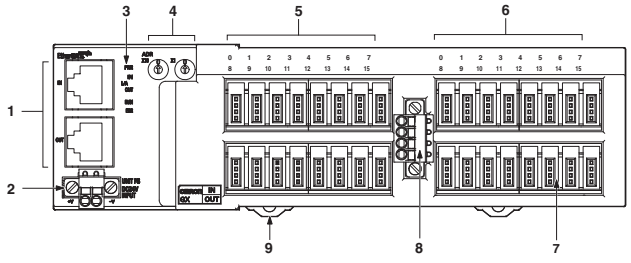
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (IN1 0 to 15, IN2 0 to 15)	Indicates the state of input contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	I/O connector (0 to 15× 2)	Connects an external device.
7	DIN track mounting hook	Fixes a slave to a DIN track.

32 Outputs Terminal GX-OD3218/OD3228



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (OUT1 0 to 15, OUT2 0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	I/O connector (0 to 15 × 2)	Connects an external device.
7	I/O power supply connector	Supplies the I/O power.
8	DIN track mounting hook	Fixes a slave to a DIN track.

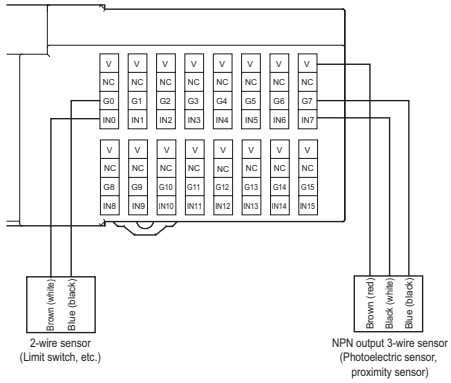
16 Inputs/16 Outputs Terminal GX-MD3218/MD3228



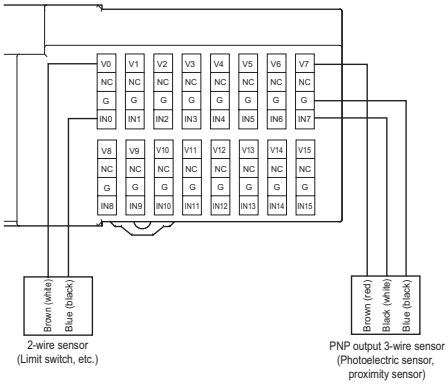
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	I/O connector (0 to 15 × 2)	Connects an external device. <Top side> For input device <Bottom side> For output device
8	I/O power supply connector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

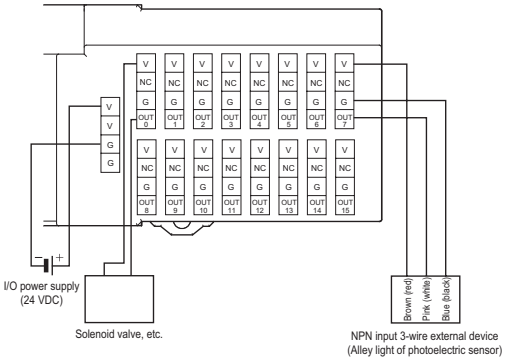
GX-ID1618 (NPN)



GX-ID1628 (PNP)



GX-OD1618 (NPN)



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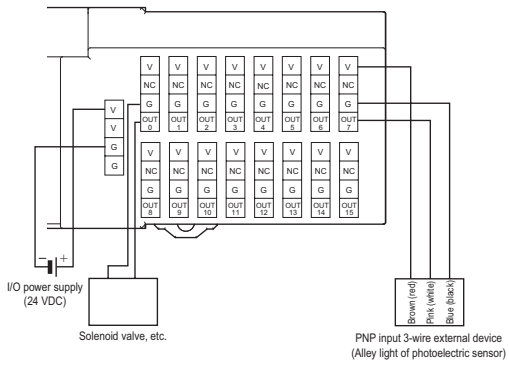
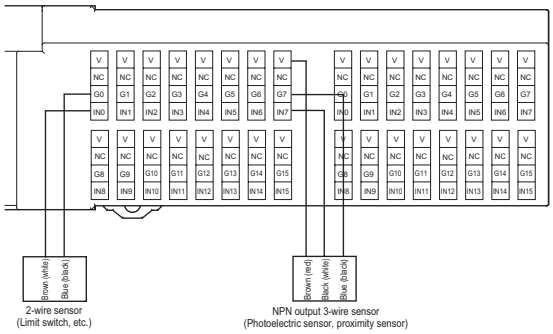
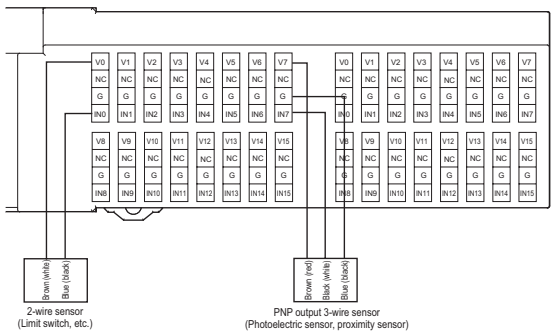


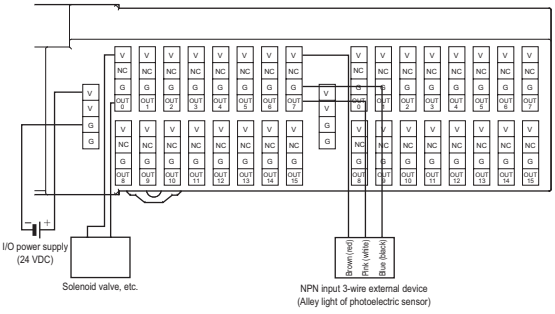
GX-ID3218 (NPN)



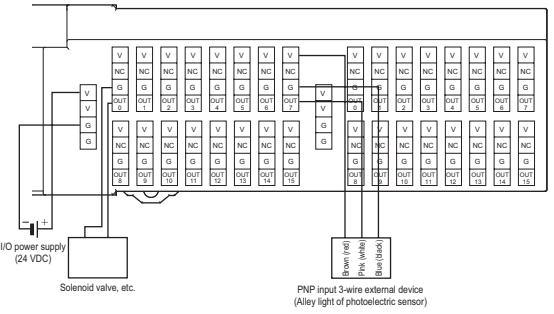
GX-ID3228 (PNP)



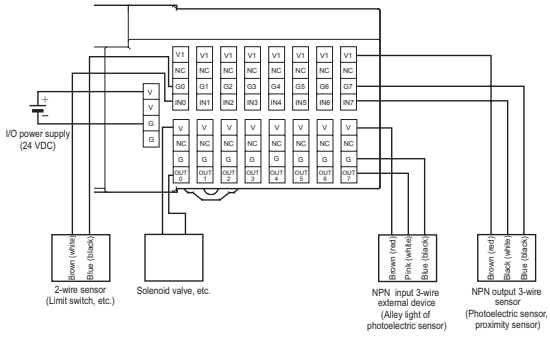
GX-OD3218 (NPN)



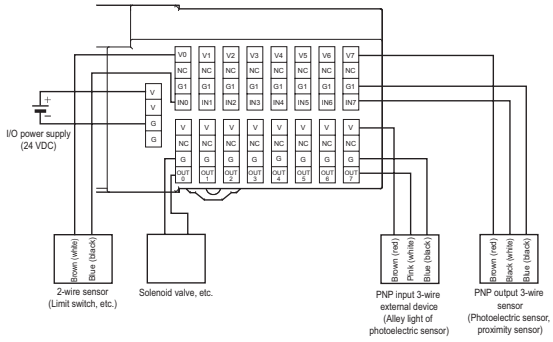
GX-OD3228 (PNP)



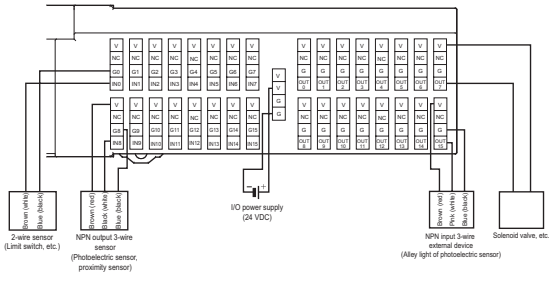
GX-MD1618 (NPN)



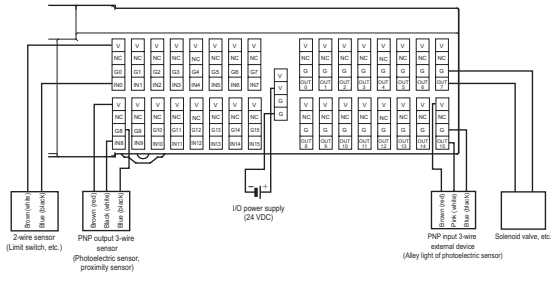
GX-MD1628 (PNP)



GX-MD3218 (NPN)



GX-MD3228 (PNP)

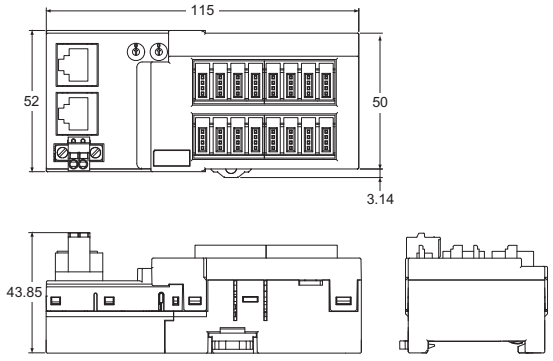


Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

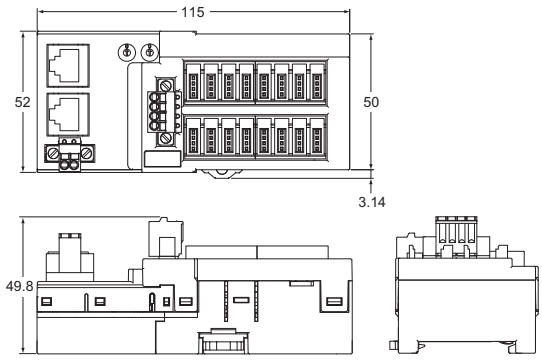
Dimensions

(Unit: mm)

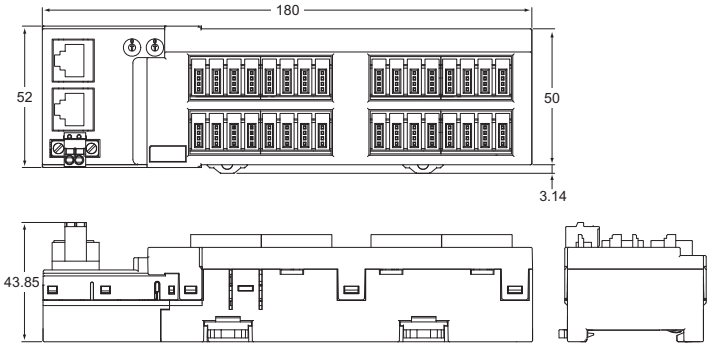
GX-ID1618/ID1628



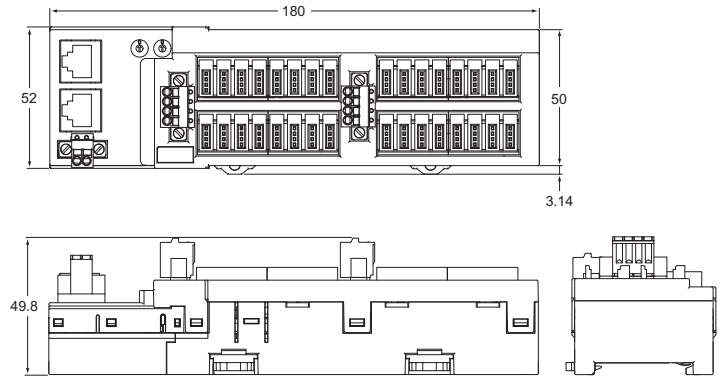
GX-OD1618/OD1628
GX-MD1618/MD1628



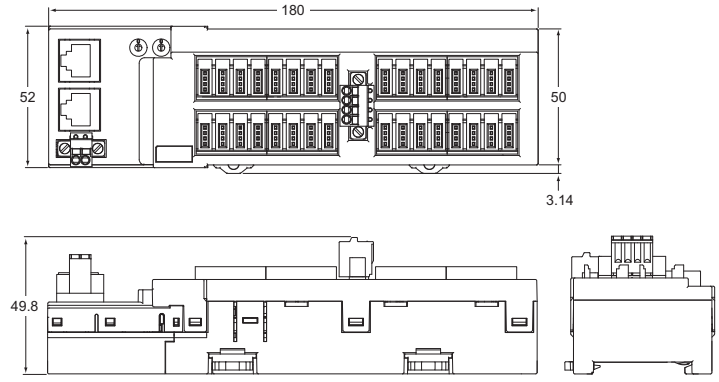
GX-ID3218/ID3228



GX-OD3218/OD3228



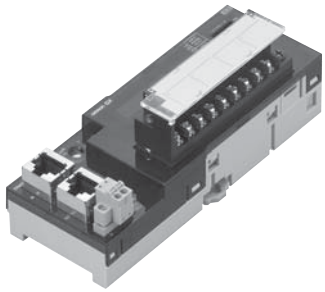
GX-MD3218/MD3228



Analog I/O Terminal 2-tier Terminal Block Type

GX-AD0471/DA0271

Analog I/O terminal with screw terminal block for EtherCAT communicaitons



- The input/output range can be easily changed by the setting with the switch.
- Detachable screw terminal block facilitates the maintenance.
- Moving average calculation function.
  Settings within the range of 100µs-64ms. (For input only.)
- Disconnection detection function.
  (For input only and for usage with 1-5V or 4-20mA ranges.)
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

General Specifications

For Common Specifications of I/O terminals, refer to page 99.

Input Section Specifications

4-point Input Terminals

Item		Specification	
		Voltage input	Current input
Input capacity		4 points (possible to set number of enabled channels)	
Input range		0 to 5V 1 to 5V 0 to 10V –10 to +10V	4 to 20mA
Input range setting method		Input range switch: Common to input CH1/CH2, common to input CH3/CH4 SDO communication: Possible to set input CH1 to CH4 individually	
Maximum signal input		± 15 V	± 30 mA
Input impedance		1 MΩ min.	Approx. 250 Ω
Resolution		1/8000 (full scale)	
Overall accuracy	25 °C	± 0.3% FS	± 0.4% FS
	–10 to +55 °C	± 0.6% FS	± 0.8% FS
Analog conversion cycle		500 µs/input When 4 points are used: 2 ms max.	
A/D converted data		Other than ± 10 V: 0000 to 1F40 Hex full scale (0 to 8000) ± 10 V: F060 to 0FA0 Hex full scale (–4000 to +4000) A/D conversion range: ± 5% FS of the above data ranges.	
Isolation method		Photocoupler isolation (between input and communications lines) No isolation between input signals	
Unit power supply current consumption		120 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight		180 g max.	
Accessories		Four short-circuit metal fixtures (for current input) *	

* Short-circuit metal fixtures are used for current input only, but store in a safe place when using for voltage inputs as well.

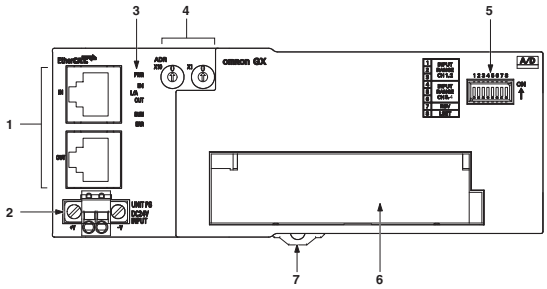
Output Section Specifications

2-point Output Terminals

Item		Specification	
		Voltage output	Current output
Output capacity		2 points (possible to set number of enabled channels)	
Output range		0 to 5V 1 to 5V 0 to 10V –10 to +10V	4 to 20mA
Output range setting method		Output range switch, SDO communications: Possible to set outputs CH1 and CH2 separately.	
External output allowable load resistance		5 kΩ min.	600 Ω max.
Resolution		1/8000 (full scale)	
Overall accuracy	25 °C	± 0.4% FS	
	–10 to +55 °C	± 0.8%FS	
Analog conversion cycle		500 µs/input When 2 points are used: 1 ms max.	
D/A converted data		Other than ± 10 V: 0000 to 1F40 Hex full scale (0 to 8000) ± 10 V: F060 to 0FA0 Hex full scale (–4000 to +4000) D/A conversion range: ± 5% FS of the above data ranges	
Isolation method		Photocoupler isolation (between output and communications lines) No isolation between output signals	
Unit power supply current consumption		150 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight		190 g max.	

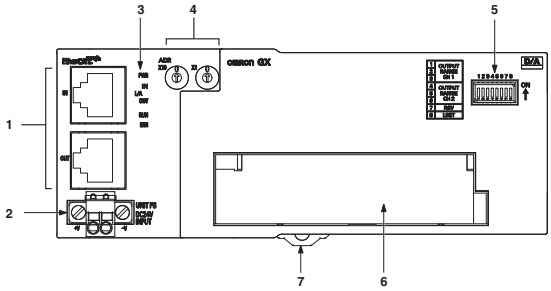
Components and functions

4-points Analog Inputs Terminal GX-AD0471



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input range switch	DIP switch for setting input range.
6	Terminal Block	Terminal block for analog input signals V1 to V4: Voltage input terminals I1 to I4: Current input terminals AG: Analog GND NC: Not used
7	DIN track mounting hook	Fixes a slave to a DIN track.

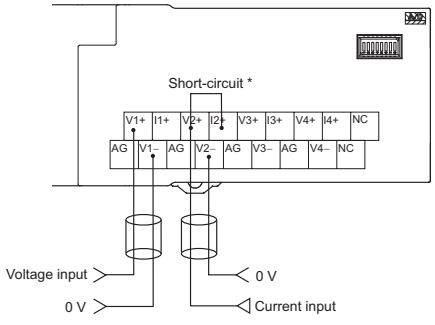
2-points Analog Inputs Terminal GX-DA0271



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output range switch	DIP switch for setting output range.
6	Terminal Block	Terminal block for analog output signals V1+, V2+: Voltage output positive terminals I1+, I2+: Current output positive terminals 1–, 2–: Voltage/current output negative terminals NC: Not used
7	DIN track mounting hook	Fixes a slave to a DIN track.

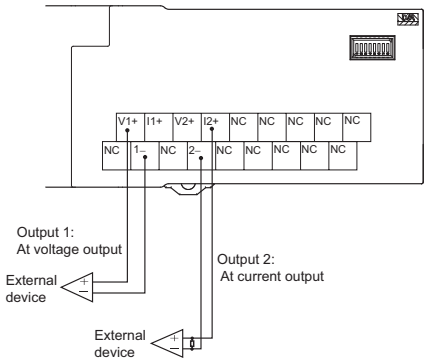
Wiring

GX-AD0471



* Short-circuit the “V positive” terminal and “I positive” terminal at current input.
Use the attached short-circuit metal fixture to short-circuit terminals.

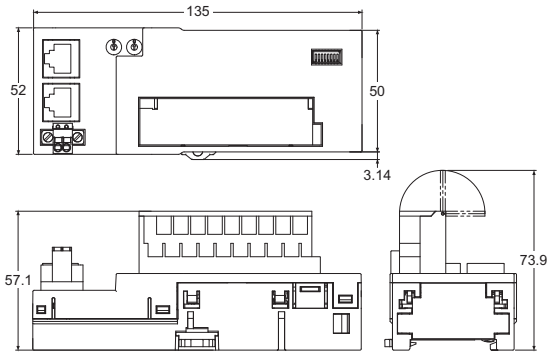
GX-DA0271


V1+ I1+ V2+ I2+ NC NC NC NC NC
NC 1– NC 2– NC NC NC NC NC
Output 1:
At voltage output
External device
Output 2:
At current output
External device

Dimensions

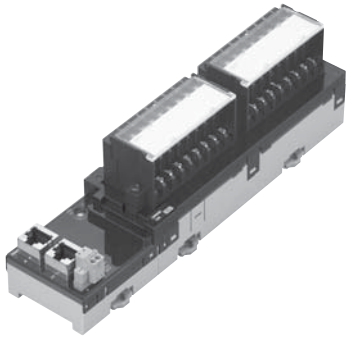
(Unit: mm)

GX-AD0471
GX-DA0271



Encoder Input Terminal 3-tier Terminal Block Type
GX-EC0211/EC0241

EtherCAT-compatible encoder input terminal which enables high-speed and accurate control



- Two counter function available. Pulse count within 32 bit range.
- Maximum input pulse frequency of 4MHz (Line driver input after quadrature). High-speed network EtherCAT enables high-speed and accurate control.
- Selectable two input types: Open collector input and line driver input.
- Built-in two external latch inputs and one reset input .
- Selectable node address settings: setting with rotary switches and setting on tool software.
- Detachable screw terminal will facilitate the maintenance work.

General Specifications

For Common Specifications of I/O terminals, refer to page 99.

Open collector inputs Type

Terminal specifications

Item	Specification
Counter point	2 points
Input signal	Counter phase A Counter phase B Counter phase Z Latch input (A/B) Counter reset input
Counter enabled status display	LED display (green)
Input indicators	LED display (yellow)
Unit power supply current consumption	130 mA max. (for 20.4 to 26.4 VDC power supply voltage)
Weight	390 g max.

Pulse input specifications

Item	Specification			
	Counter phase A/B		Counter phase Z	
Input voltage	20.4 to 26.4 VDC (24 VDC −15 to +10%)	4.5 to 5.5 VDC (5 VDC ±5%)	20.4 to 26.4 VDC (24 VDC −15 to +10%)	4.5 to 5.5 VDC (5 VDC ±5%)
Input current	8.4 mA (at 24 VDC)	8.6 mA (at 5 VDC)	8.4 mA (at 24 VDC)	8.6 mA (at 5 VDC)
ON voltage	19.6 V min.	4.5 V min.	18.6 V min.	4.5 V min.
OFF voltage	4 V max.	1.5 V max.	4 V max.	1.5 V max.
Input restriction resistance	2.7 kΩ	430 Ω	2.7 kΩ	430 Ω
Maximum response frequency	Single phase 500 kHz (phase difference Multiplication × 4, 125 kHz)		125 kHz	
Filter switching	NA		NA	

Latch/reset input specifications

Item	Specification	
	Latch input (A/B)	Reset input
Internal I/O common	NPN	
Input voltage	20.4 to 26.4 VDC (24 VDC −15 to +10%)	20.4 to 26.4 VDC (24 VDC −15 to +10%)
Input impedance	4.0 kΩ	3.3 kΩ
Input current	5.5 mA (at 24 VDC)	7 mA (at 24 VDC)
ON voltage/ON current	17.4 VDC min./3 mA min.	14.4 VDC min./3 mA min.
OFF voltage/OFF current	5 VDC max./1 mA max.	5 VDC max./1 mA max.
ON response time	3 μs max.	15 μs max.
OFF response time	3 μs max.	90 μs max.

Note: For the pulse input timing specifications, refer to USER'S MANUAL (Cat. No. W488).

Line Driver inputs Type

Terminal specifications

Item	Specification
Counter point	2 points
Input signal	Counter phase A Counter phase B Counter phase Z Latch input (A/B) Counter reset input
Counter enabled status display	LED display (green)
Input indicators	LED display (yellow)
Unit power supply current consumption	100 mA max. (for 20.4 to 26.4 VDC power supply voltage)
Weight	390 g max.

Pulse input specifications

Item	Specification	
	Counter phase A/B	**Counter phase Z**
Input voltage	EIA standard RS-422-A line driver level	
Input impedance	120 Ω ±5%	
gH level input voltage	0.1 V	
gL level input voltage	−0.1 V	
Hysteresis voltage	60 mV	
Maximum response frequency	Single phase 4 MHz (phase difference Multiplication ×4, 1 MHz)	1 MHz
Filter switching	NA	

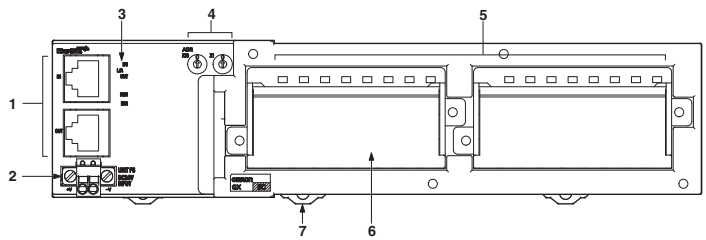
Latch/reset input specifications

Item	Specification	
	Latch input (A/B)	**Reset input**
Internal I/O common	PNP	
Input voltage	20.4 to 26.4 VDC (24 VDC −15 to +10%)	20.4 to 26.4 VDC (24 VDC −15 to +10%)
Input impedance	4.0 kΩ	3.3 kΩ
Input current	5.5 mA (at 24 VDC)	7 mA (at 24 VDC)
ON voltage/ON current	17.4 VDC min./3 mA min.	14.4 VDC min./3 mA min.
OFF voltage/OFF current	5 VDC max./1 mA max.	5 VDC max./1 mA max.
ON response time	3 μs max.	15 μs max.
OFF response time	3 μs max.	90 μs max.

Note: For the pulse input timing specifications, refer to USER'S MANUAL (Cat. No. W488).

Components and functions

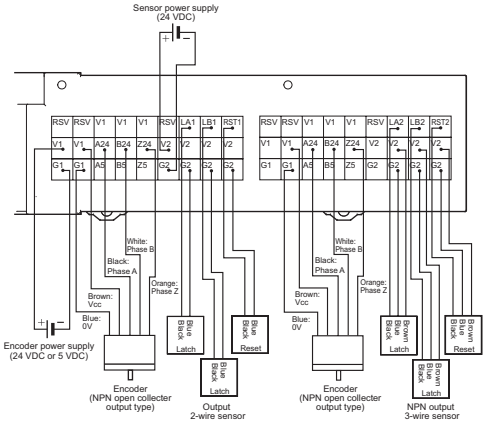
Open collector inputs Type GX-EC0211
Line driver inputs Type GX-EC0241

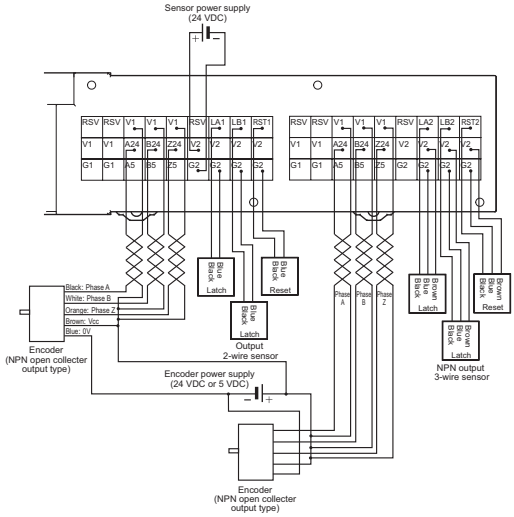


No.	Name	Function
1	Communications Connectors	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status Indicators	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switches	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Inputs Indicators	The indicators show the status of the inputs of each channel. For details, refer to GX Series Operation Manual (Cat.No.W488).
6	Terminal Block	Connects external devices and the I/O power supply. For details, refer to GX Series Operation Manual (Cat.No.W488).
7	DIN track mounting hook	Fixes Slave Unit to a DIN track.

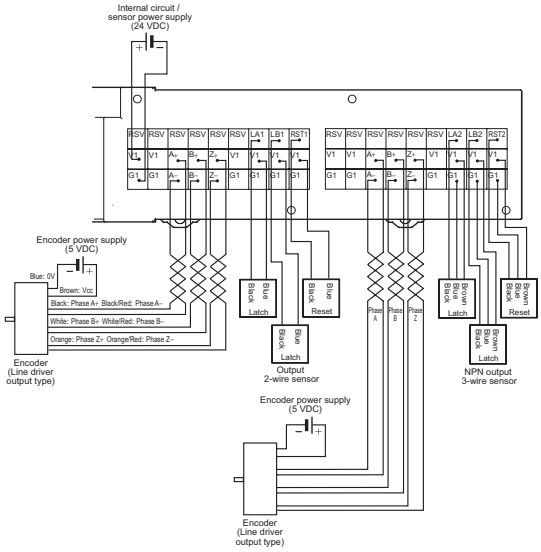
Wiring

Open collector inputs Type GX-EC0211





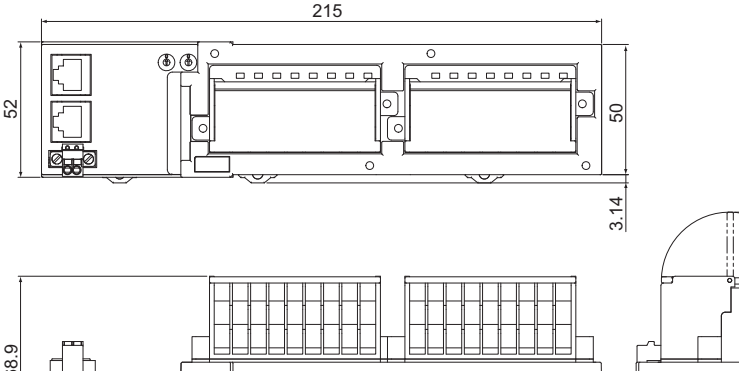
Line driver inputs Type GX-EC0241



Dimensions

(Unit: mm)

GX-EC0211/EC0241

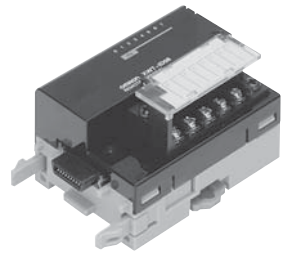


Expansion Units

XWT-□D08(-1)/□D16(-16)

Expansion I/O Units make expansion easy!

- Flexible expansion with many different combinations.
- Removable I/O terminal block enables faster startup time and improved maintainability.
- Common expansion unit with DeviceNet (DRT2-Series) and CompoNet (CRT1-Series).



General Specifications

For Common Specifications of I/O terminals, refer to page 99.

Input Section Specifications

8-point Input Expansion Units

Item	Specification	
	XWT-ID08	XWT-ID08-1
Internal I/O common	NPN	PNP
I/O capacity	8 inputs	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	At 24 VDC: 6.0 mA max./input At 17 VDC: 3.0 mA max./input	
ON delay	1.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 inputs/common	
Communications power supply current consumption	5 mA	
Weight	80 g max.	

16-point Input Expansion Units

Item	Specification	
	XWT-ID16	XWT-ID16-1
Internal I/O common	NPN	PNP
I/O capacity	16 inputs	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	At 24 VDC: 6.0 mA max./input At 17 VDC: 3.0 mA max./input	
ON delay	1.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 inputs/common	
Communications power supply current consumption	10 mA	
Weight	120 g max.	

Output Section Specifications

8-point Input Expansion Units

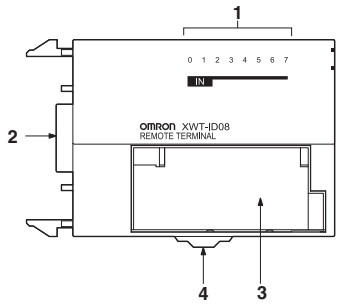
Item	Specification	
	XWT-OD08	XWT-OD08-1
Internal I/O common	NPN	PNP
I/O capacity	8 outputs	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 A DC, between each output terminal and the G terminal)	1.2 V max. (0.5 A DC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 outputs/common	
Communications power supply current consumption	5 mA	
Weight	80 g max.	

16-point Input Expansion Units

Item	Specification	
	XWT-OD16	XWT-OD16-1
Internal I/O common	NPN	PNP
I/O capacity	16 outputs	
Rated output current	0.5 A/output, 4.0 A/common	
Residual voltage	1.2 V max. (0.5 A DC, between each output terminal and the G terminal)	1.2 V max. (0.5 A DC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 outputs/common	
Communications power supply current consumption	10 mA	
Weight	120 g max.	

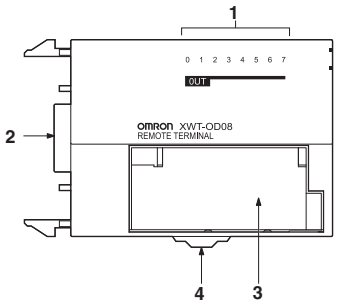
Components and functions

XWT-ID08/ID08-1



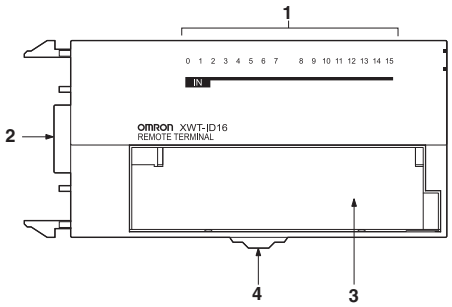
No.	Name	Function
1	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 7: Input terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

XWT-OD08/OD08-1



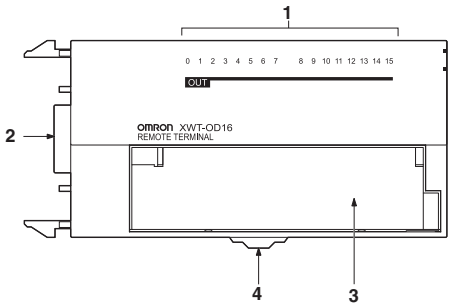
No.	Name	Function
1	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 7: Output terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

XWT-ID16/ID16-1



No.	Name	Function
1	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Input terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

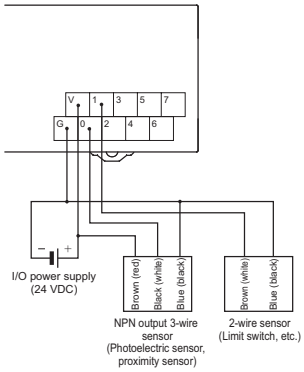
XWT-OD16/OD16-1



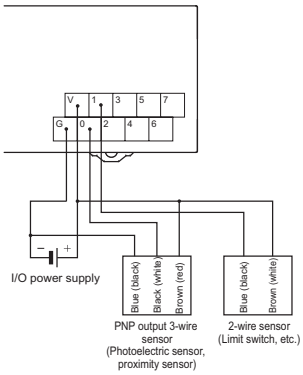
No.	Name	Function
1	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Output terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

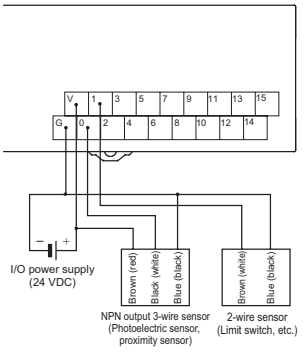
XWT-ID08 (NPN)



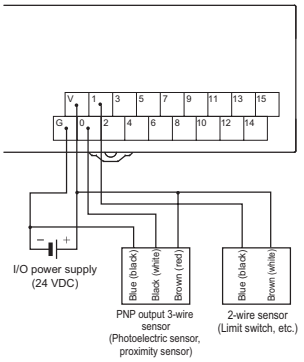
XWT-ID08-1 (PNP)



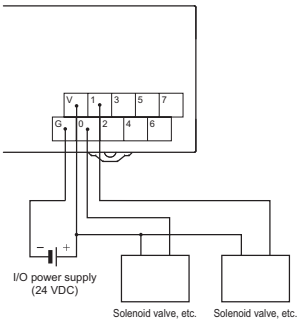
XWT-ID16 (NPN)



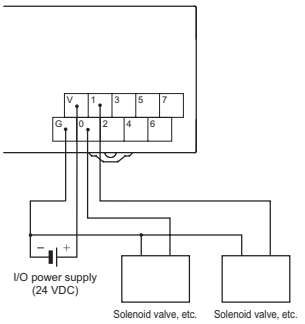
XWT-ID16-1 (PNP)



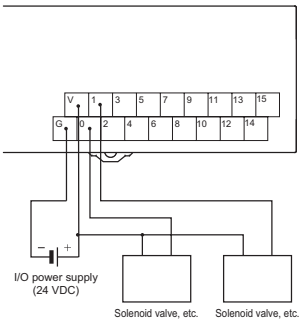
XWT-OD08 (NPN)



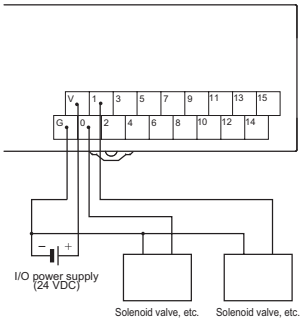
XWT-OD08-1 (PNP)



XWT-OD16 (NPN)



XWT-OD016-1 (PNP)

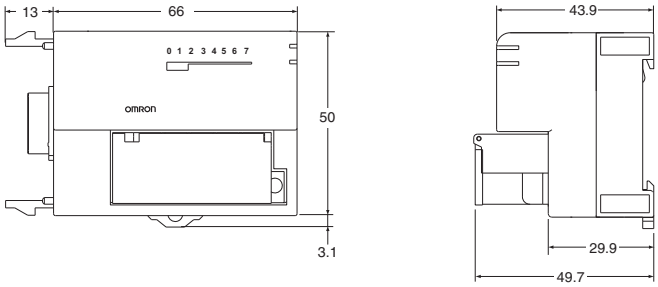


Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

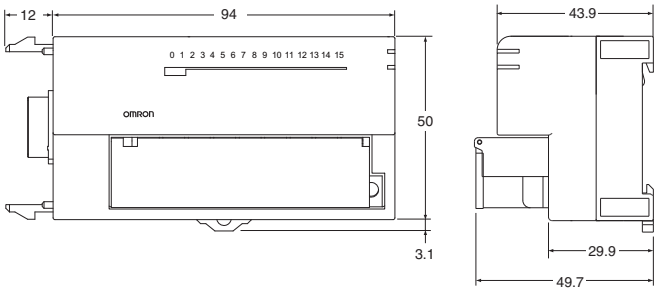
Dimensions

(Unit: mm)

XWT-ID08/ID08-1
XWT-OD08/OD08-1



XWT-ID16/ID16-1
XWT-OD16/OD16-1



GRT1-□

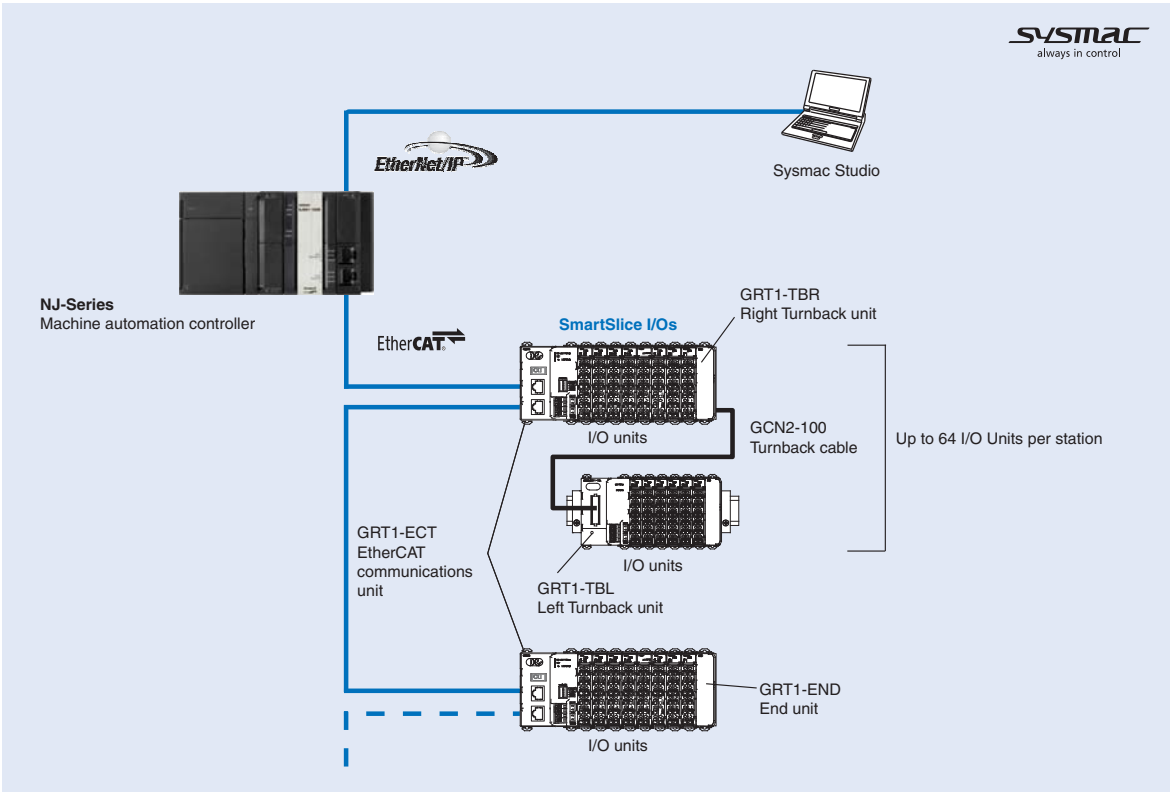
SmartSlice I/O

Plug-and-Play I/O

Remote I/O with digital and analogue I/O units, relay outputs and configurable temperature inputs. All SmartSlice units feature screwless 'push-in' I/O wiring, detachable I/O connector, and hot-swap capability. The EtherCAT 'coupler' automatically scans the connected I/O units at startup. The NJ-Series controller will verify the detected configuration against the registered configuration at startup.

- Up to 64 I/O units per station
- Screwless wiring
- Automatic I/O assignment
- Easy configuration backup
- Hot-swap with auto-restore
- Optional address setting

System Configuration



Specifications/Wiring

General Specifications

Common SmartSlice Specifications	
Unit power supply voltage	24 VDC (20.4 to 26.4 VDC)
I/O power supply voltage	24 VDC (20.4 to 26.4 VDC)
I/O connection	Screwless push-in technology
Noise immunity	Conforms to IEC61000-4-4, 2.0 kV (power supply line)
Vibration resistance	10 to 60 Hz: 0.7 mm double amplitude 60 to 150 Hz: 50 m/s^2
Shock resistance	150 m/s^2, 3 times in each direction
Dielectric strength	500 VAC (between isolated circuits)
Insulation resistance	20 MΩ min. (between isolated circuits)
Ambient operating temperature	-10 to 55°C (with no icing or condensation)
Ambient operating humidity	25% to 85%
Operating environment	No corrosive gases
Ambient storage temperature	-25 to 65°C (with no icing or condensation)
Mounting	35 mm DIN rail

Communication Units

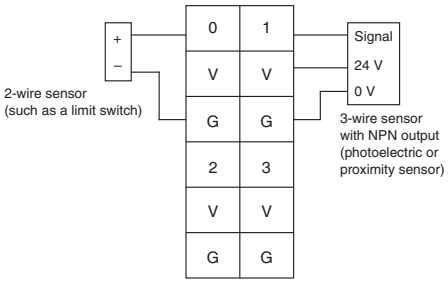
Model name	GRT1-ECT
Network Specification	EtherCAT for Sysmac (NJ)
Network connector	2 x RJ45
Network interface power supply	External 24 VDC (+10% - 15%)
Number of I/O points	1,024 inputs and outputs max. (128 bytes total)
Number of connectable Units	64 SmartSlice I/O Units max.
I/O power supply	24 VDC, 4 A max.
Status flags	1 word for Communications Unit status flag
Parameter backup and restore	Up to 2 KB of data per I/O Unit

Digital Input Units

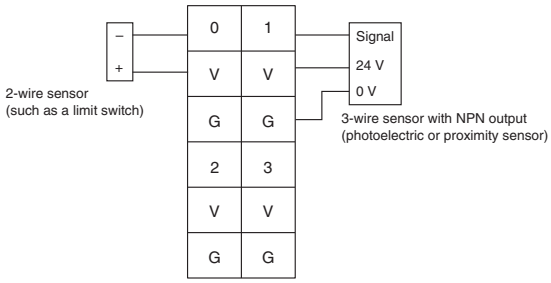
Model name	GRT1-ID4	GRT1-ID4-1	GRT1-ID8	GRT1-ID8-1
Signal type	DC input (for sinking outputs, NPN type)	DC input (for sourcing outputs, PNP type)	DC input (for sinking outputs, NPN type)	DC input (for sourcing outputs, PNP type)
Number of input points	4 inputs		8 inputs	
Power terminals	4 x V (24 V) + 4 x G (0 V)		4 x G (0 V)	4 x V (24 V)
ON voltage	15 VDC min.			
ON current	6 mA max./point (at 24 VDC)		4 mA max./point (at 24 VDC)	
OFF voltage	5 VDC max.			
OFF current	1 mA max.			
ON delay / OFF delay	1.5 ms max.			

Model name	GRT1-IA4-1	GRT1-IA4-2
Signal type	AC input, 110 V	AC input, 230 V
Number of input points	4 inputs	
Power terminals	None	
Input voltage	100 to 120 VAC -15% to +10%, 50/60 Hz	200 to 240 VAC -15% to +10%, 50/60 Hz
ON voltage	70 VAC min.	120 VAC min.
ON current	4 mA min.	
OFF voltage	20 VAC max.	
OFF current	2 mA max.	
ON delay / OFF delay	10 ms max./55 ms max.	10 ms max./40 ms max.

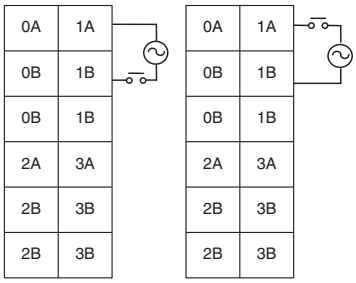
GRT1-ID4 (NPN)



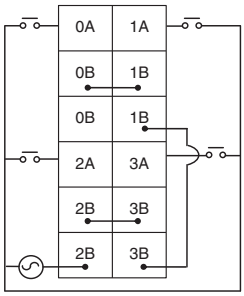
GRT1-ID4 -1 (PNP)



GRT1-IA4-1/GRT1-IA4-2

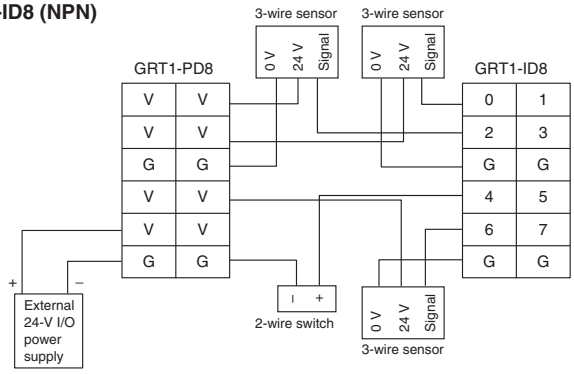


Note: No common signal for inputs.

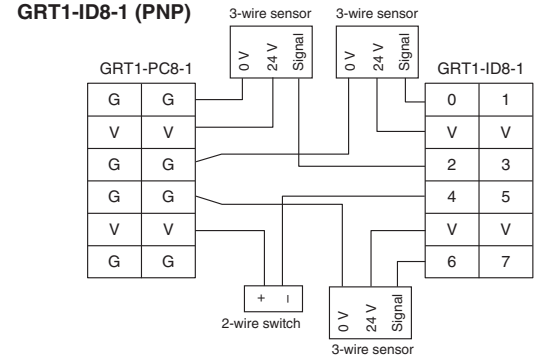


Note: Common signal for four inputs.

GRT1-ID8 (NPN)



GRT1-ID8-1 (PNP)

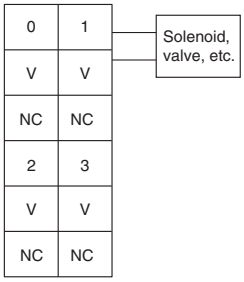


Digital Output Units

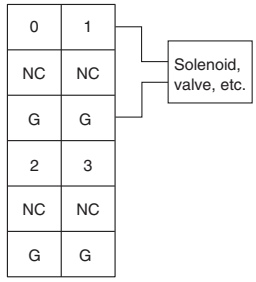
Model name	GRT1-OD4	GRT1-OD4-1	GRT1-OD4G-1	GRT1-OD4G-3
Signal type	Transistor output (NPN type, sinking)	Transistor output (PNP type, sourcing)	Transistor output (PNP type, sourcing), with short-circuit protection	
Number of output points	4 outputs			
Power terminals	4 x V (24 V)	4 x G (0 V)	4 x V (24 V) + 4 x G (0 V)	
Rated voltage	24 VDC (20.4 to 26.4 VDC)			24 V I/O power supply via the front terminal of the unit.
Rated output current	500 mA max./point			from 4 x 2.0 A at 30 °C to 4 x 1.0 A at 55 °C
Residual voltage	1.2 VDC max. (at 500 mA)			1.2 VDC max. (at 2 A)
Leakage cuurent	0.1 mA max.			
ON delay / Off delay	0.5 / 1.5 ms max.			

Model name	GRT1-OD8	GRT1-OD8-1	GRT1-OD8G-1	GRT1-ROS2
Signal type	Transistor output (NPN type, sinking)	Transistor output (PNP type, sourcing)	Transistor output (PNP type, sourcing), with short-circuit protection	Relay output (normally open)
Number of output points	8 outputs			2 outputs (with 2 terminals per connection)
Power terminals	4 x V (24 V)	4 x G (0 V)		n.a.
Rated voltage	24 VDC (20.4 to 26.4 VDC)			250 VAC / 24 VDC
Rated output current	500 mA max./point			2 A (min. 1 mA @ 5 VDC)
Residual voltage	1.2 VDC max. (at 500 mA)			-
Leakage cuurent	0.1 mA max.			-
ON delay / Off delay	0.5 / 1.5 ms max.			15 ms max.
Mechanical life expectancy	-			20,000,000 times min.
Electrical life expectancy	-			100,000 times min.

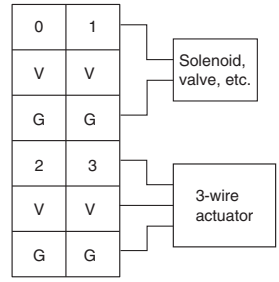
GRT1-OD4



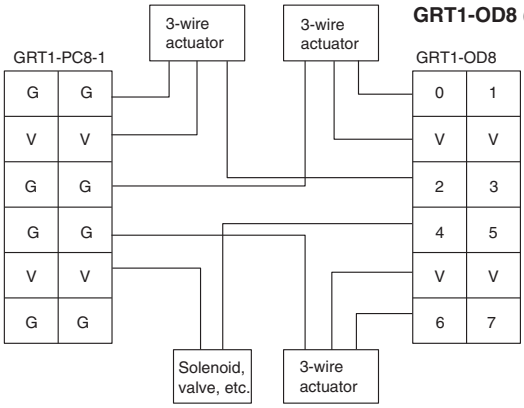
GRT1-OD4-1



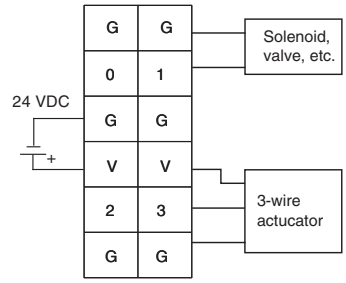
GRT1-OD4G-1 (PNP)



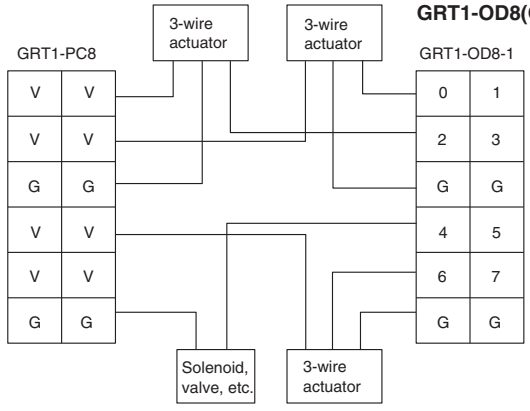
GRT1-OD8 (NPN)



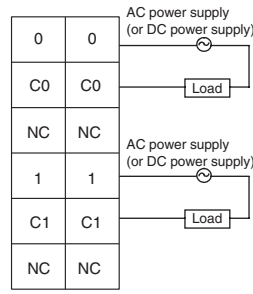
GRT1-OD4G-3 (PNP)



GRT1-OD8(G)-1 (PNP)



GRT1-ROS2

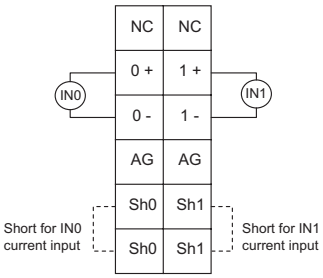


Analog I/O Units

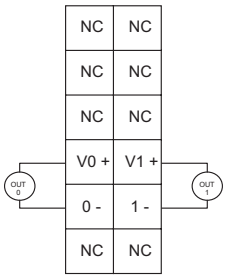
Model name	GRT1-AD2	GRT1-DA2V	GRT1-DA2C
Signal type	Analog Input: 0-20mA, 4-20mA, ±10V, 0-10V, 0-5V, 1-5V	Analog Output: ±10V, 0-10V, 0-5V, 1-5V	Analog Output: 0-20mA, 4-20mA,
Number of points	2 inputs	2 outputs	
Resolution	1/6000 full scale		
Conversion time	2ms / 2points		

Model name	GRT1-TS2P	GRT1-TS2PK	GRT1-TS2T
Signal type	Temperature input, Pt100, (2-wire, 3-wire)	Temperature input, Pt1000, (2-wire, 3-wire)	Thermocouple, R, S, K, J, T, E, B, N, L, U, W, or PL2
Number of points	2 inputs		
Indication range	-200 to +200 °C / -200 to +850 °C		Depends on thremocouple type
Accuracy	±0.3% of PV or ±0.8 °C* (whichever is larger) ±1 digit max. * (or ±0.5 °C for -200 °C to +200 °C input range)		±2°C ±1 digit max. Mounting restrictions apply. See Operation Manual W455
Resolution	0.1 °C, 16-bit signed integer, or 0.01 °C, 32-bit signed double integer		
Conversion time	250 ms / 2 points		

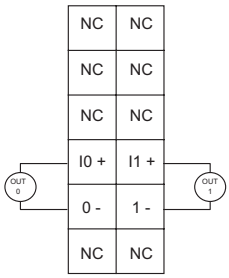
GRT1-AD2



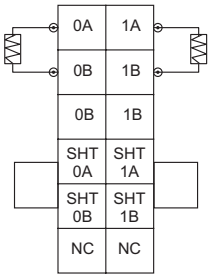
GRT1-DA2V



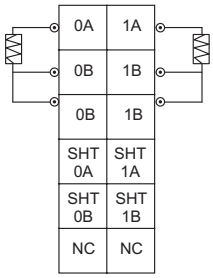
GRT1-DA2C



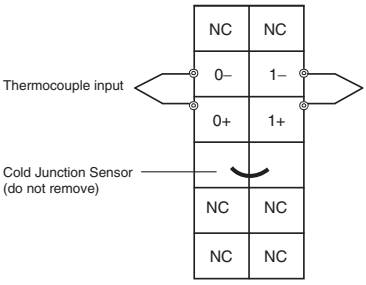
GRT1-TS2P/PK (2-wire)



GRT1-TS2P/PK (3-wire)

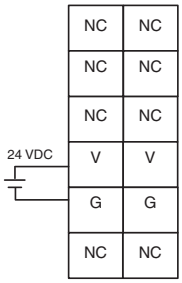


GRT1-TS2T

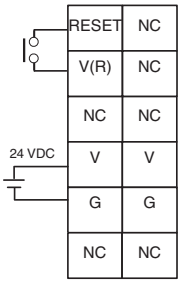


Power Feed and Distribution Units

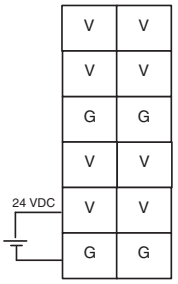
GRT1-PD2



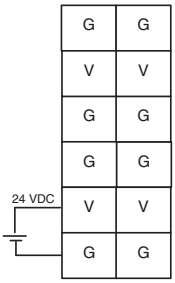
GRT1-PD2G



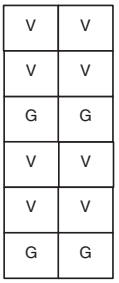
GRT1-PD8



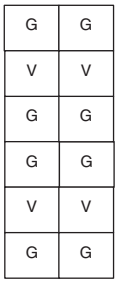
GRT1-PD8-1



GRT1-PC8

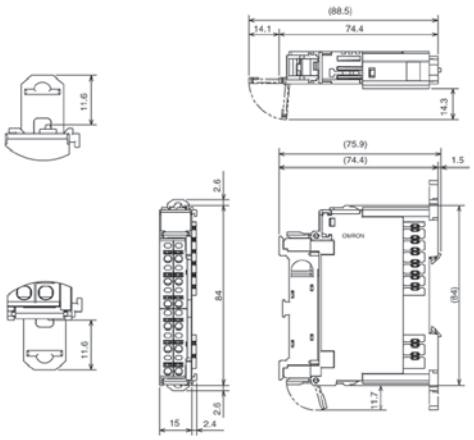


GRT1-PC8-1



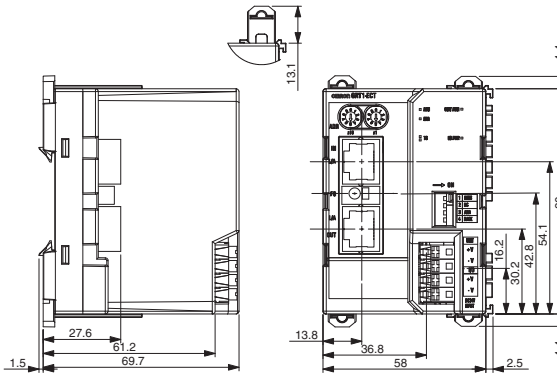
Dimensions

I/O-units



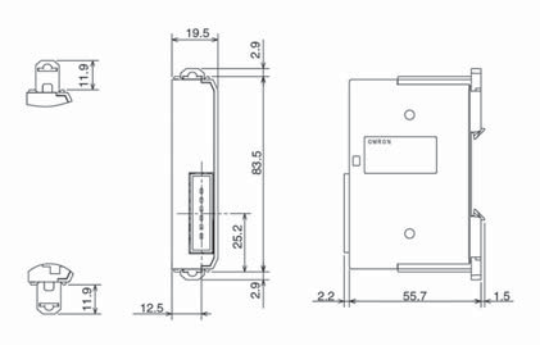
Communication Units

GRT1-ECT



End units

GRT1-END
GRT1-END-M
GRT1-TBR



Ordering Information

Ordering Information
Machine Automation Controller NJ-Series 140
Automation Software Sysmac Studio 154
AC Servomotor/Drives G5-Series 156
Multi-function Compact Inverter MX2-Series 174
Vision Sensor FQ-M-Series 179
EtherCAT Remote I/O Terminal GX-Series 181
Programmable Terminals NS-Series 183

Related Manuals

International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details and applicable conditions for these standards.

● EC Directives

The EC Directives applicable to PLCs include the EMC Directives and the Low Voltage Directive. OMRON complies with these directives as described below.

●EMC Directives

Applicable Standards
EMI: EN61000-6-4, EN61131-2
EMS: EN61000-6-2, EN61131-2

PLCs are electrical devices that are incorporated in machines and manufacturing installations. OMRON PLCs conform to the related EMC standards so that the devices and machines into which they are built can more easily conform to EMC standards. The actual PLCs have been checked for conformity to EMC standards. Whether these standards are satisfied for the actual system, however, must be checked by the customer.

EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PLC is installed. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

●Low Voltage Directive

Applicable Standard:EN61131-2

VDC must satisfy the appropriate safety requirements. With PLCs, this applies to Power Supply Units and I/O Units that operate in these voltage ranges.

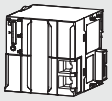
These Units have been designed to conform to EN61131-2, which is the applicable standard for PLCs.

Ordering Information

Basic Configuration Units

CPU Rack

NJ501 CPU Units

Product name	Specifications				Current consumption (A)		Model	Standards
	I/O capacity / maximum umber of configuration Units (Expansion Racks)	Program capacity	Memory capacity for variables	Number of motion axes	5 VDC	24 VDC		
NJ501 CPU Units 	2,560 points / 40 Units (3 Expansion Racks)	20 MB	2 MB: Retained during power interruption 4 MB: Not retained during power interruption	16	1.90 A	---	NJ501-1300	UC1, N, L, CE
				32			NJ501-1400	
				64			NJ501-1500	

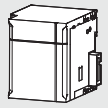
Accessories

The following accessories come with the CPU Unit.

Item	Specification
Battery	CJ1W-BAT01
End Cover	CJ1W-TER01 (necessary to be connected to the right end of the CPU Rack.)
End Plate	PFP-M (2 pcs)

■ Power Supply Units

One Power Supply Unit is required for each Rack.

Product name		Power supply voltage	Output current		Output capacity	Options			Model	Standards
			5-VDC output capacity	24-VDC output capacity	Total power consump-tion	24-VDC service power supply	RUN output	Maintenance forecast monitor		
AC Power Supply Unit		100 to 240 VAC	6.0 A	1.0 A	30 W	No	Yes	No	NJ-PA3001	UC1, N, L, CE
DC Power Supply Unit		24 VDC							NJ-PD3001	

Note: Power supply units for the CJ-Series cannot be used as a power supply for a CPU rack of the NJ system or as a power supply for an expansion rack.

Expansion Racks

Select the I/O Control Unit, I/O Interface Unit, Expansion Connecting Cable, and CJ-Series Power Supply Unit.

■ CJ-Series I/O Control Unit (Mounted on CPU Rack when Connecting Expansion Racks)

Product name	Specifications	Current consumption (A)		Model	Standards
		5 V	24 V		
CJ-Series I/O Control Unit	Mount one I/O Control Unit on the CJ-Series CPU Rack when connecting one NJ-Series Expansion Racks. Connecting Cable: CS1W-CN□□3 Expansion Connecting Cable Connected Unit: CJ1W-II101 I/O Interface Unit Mount to the right of the CPU Unit.	0.02	---	CJ1W-IC101	UC1, N, L, CE

Note: Mounting the I/O Control Unit in any other location may cause faulty operation.

■ CJ-Series I/O Interface Unit (Mounted on Expansion Rack)

Product Name	Specifications	Current consumption (A)		Model	Standards
		5 V	24 V		
CJ-Series I/O Interface Unit	One I/O Interface Unit is required on each Expansion Rack. Connecting Cable: CS1W-CN□□3 Expansion Connecting Cable Mount to the right of the Power Supply Unit.	0.13	---	CJ1W-II101	UC1, N, L, CE

Note: Mounting the I/O Interface Unit in any other location may cause faulty operation.

■ I/O Connecting Cables

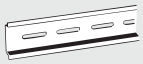
Product name	Specifications		Model	Standards
I/O Connecting Cable	• Connects an I/O Control Unit on NJ-Series CPU Rack to an I/O Interface Unit on a NJ-Series Expansion Rack. or • Connects an I/O Interface Unit on NJ-Series Expansion Rack to an I/O Interface Unit on another NJ-Series Expansion Rack.	Cable length: 0.3 m	CS1W-CN313	N, L, CE
		Cable length: 0.7 m	CS1W-CN713	
		Cable length: 2 m	CS1W-CN223	
		Cable length: 3 m	CS1W-CN323	
		Cable length: 5 m	CS1W-CN523	
		Cable length: 10 m	CS1W-CN133	
		Cable length: 12 m	CS1W-CN133-B2	

Optional Products and Maintenance Products

Product name	Specifications	Model	Standards
Memory Cards	SD memory card, 2GB	HMC-SD291	---

Product name	Specifications		Model	Standards
Battery Set	Battery for NJ501-□□□□ NJ-Series CPU Unit maintenance	**Note: 1.** The battery is included as a standard accessory with the CPU Unit. **2.** The battery service life is 5 years at 25°C. (The service life depends on the ambient operating temperature and the power conditions.) **3.** Use batteries within two years of manufacture.	CJ1W-BAT01	---
End Cover	Mounted to the right-hand side of NJ-Series CPU Racks or Expansion Racks.	One End Cover is provided as a standard accessory with each CPU Unit and I/O Interface Unit.	CJ1W-TER01	UC1, N, L, CE

DIN Track Accessories

Product name	Specifications	Model	Standards
DIN Track 	Length: 0.5 m; Height: 7.3 mm	PFP-50N	---
	Length: 1 m; Height: 7.3 mm	PFP-100N	
	Length: 1 m; Height: 16 mm	PFP-100N2	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.	PFP-M	

Connecting Cable

■ Peripheral (USB) Port

Use commercially available USB cable.

Specifications: USB 1.1 or 2.0 cable (A connector - B connector), 5.0 m max.

■ Recommended EtherCAT and EtherNet/IP Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.

Use Straight or cross STP (shielded twisted-pair) cable of category 5 or higher for EtherNet/IP.

Item			Recommended manufacturer	Cable length (m) *1	Model
For EtherCAT	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cable with Connectors on Both Ends (RJ45/RJ45)	OMRON	0.3	XS5W-T421-AMD-K
				0.5	XS5W-T421-BMD-K
				1	XS5W-T421-CMD-K
		Cable with Connectors on Both Ends (M12/RJ45)	OMRON	2	XS5W-T421-DMC-K
				5	XS5W-T421-GMC-K
				10	XS5W-T421-JMC-K
For EtherCAT and EtherNet/IP	Wire Gauge and Number of Pairs: AWG24, 4-pair Cable	Cables	Tonichi Kyosan Cable, Ltd.		NETSTAR-C5E SAB 0.5 × 4P
			Kuramo Electric Co.		KETH-SB
			SWCC Showa Cable Systems Co.		FAE-5004
		RJ45 Connectors	Panduit Corporation		MPS588
	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cables	Kuramo Electric Co.		KETH-PSB-OMR *2
		RJ45 Assembly Connector	OMRON		XS6G-T421-1 *2
For EtherNet/IP	Wire Gauge and Number of Pairs: 0.5 mm, 4-pair Cable	Cables	Fujikura Ltd.		F-LINK-E 0.5mm × 4P
		RJ45 Connectors	Panduit Corporation		MPS588

*1 The cable length 0.3, 0.5, 1, 2, 3, 5, 10 and 15 m are available. For details, refer to Cat.No.G019.

*2 We recommend you to use above cable and connector together.

Note: Please be careful while cable processing, for EtherCAT, connectors on both ends should be shield connected and for EtherNet/IP, connectors on only one end should be shield connected.

Basic I/O Units

■ Input Units

Unit classification	Product name	Specifications				Number of bits allocated	Response time *1		Current consumption (A)		Model	Standards
		I/O points	Input voltage and current	Commons	External connection		ON	OFF	5 V	24 V		
CJ1 Basic I/O Units	DC Input Units	8 inputs	12 to 24 VDC, 10 mA	Independent contacts	Removable terminal block	16 *2	20 μs max.	400 μs max.	0.08	---	CJ1W-ID201	UC1, N, L, CE
		16 inputs	24 VDC, 7 mA	16 points, 1 common	Removable terminal block	16	20 μs max.	400 μs max.	0.08	---	CJ1W-ID211	
		16 inputs High-speed type	24 VDC, 7 mA	16 points, 1 common	Removable terminal block	16	15 μs max.	90 μs max.	0.13	---	CJ1W-ID212	
		32 inputs	24 VDC, 4.1 mA	16 points, 1 common	Fujitsu connector	32	20 μs max.	400 μs max.	0.09	---	CJ1W-ID231 *3	
		32 inputs	24 VDC, 4.1 mA	16 points, 1 common	MIL connector	32	20 μs max.	400 μs max.	0.09	---	CJ1W-ID232 *3	
		32 inputs High-speed type	24 VDC, 4.1 mA	16 points, 1 common	MIL connector	32	15 μs max.	90 μs max.	0.20	---	CJ1W-ID233 *3	
		64 inputs	24 VDC, 4.1 mA	16 points, 1 common	Fujitsu connector	64	120 μs max.	400 μs max.	0.09	---	CJ1W-ID261 *3	
		64 inputs	24 VDC, 4.1 mA	16 points, 1 common	MIL connector	64	120 μs max.	400 μs max.	0.09	---	CJ1W-ID262 *3	
	AC Input Units	8 inputs	200 to 24 VAC, 10 mA (200 V, 50 Hz)	8 points, 1 common	Removable Terminal Block	16 *2	10 μs max.	40 μs max.	0.08	---	CJ1W-IA201	
		16 inputs	100 to 120 VAC, 7 mA (100 V, 50 Hz)	16 points, 1 common	Removable Terminal Block	16	10 μs max.	40 μs max.	0.09	---	CJ1W-IA111	

*1 This is the input response time when no filter (i.e., 0 ms) is set.
*2 Although 16 I/O bits are allocated, only 8 of these can be used for external I/O. These Units are also treated as 16-point I/O Units in the Unit configuration.
*3 The cable-side connector is not provided with Units equipped with cables. Purchase the 40-pin connector separately (Refer to page 146), or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal .

■ Output Units

Unit classification	Product name	Specifications					Number of bits allocated	Current consumption (A)		Model	Standards
		Output type	I/O points	Maximum switching capacity	Commons	External connection		5 V	24 V		
CJ1 Basic I/O Units	Relay Contact Output Units	–	8 outputs	250 VAC/24 VDC, 2 A	Independent contacts	Removable terminal block	16 *1	0.09	0.048 max.	CJ1W-OC201	UC1, N, L, CE
		–	16 outputs	250 VAC/24 VDC, 2 A	16 points, 1 common	Removable terminal block	16	0.11	0.096 max.	CJ1W-OC211	
	Triac Output Unit	–	8 outputs	250 VAC, 0.6 A	8 points, 1 common	Removable terminal block	16 *1	0.22	–	CJ1W-OA201	
	Transistor Output Units	Sinking	8 outputs	12 to 24 VDC, 2 A	4 points, 1 common	Removable terminal block	16 *1	0.09	–	CJ1W-OD201	
		Sinking	8 outputs	12 to 24 VDC, 0.5 A	8 points, 1 common	Removable terminal block	16 *1	0.10	–	CJ1W-OD203	
		Sinking	16 outputs	12 to 24 VDC, 0.5 A	16 points, 1 common	Removable terminal block	16	0.10	–	CJ1W-OD211 *2	
		Sinking	16 outputs High-speed type	24 VDC, 0.5 A	16 points, 1 common	Removable terminal block	16	0.15	–	CJ1W-OD213 *2	
		Sinking	32 outputs	12 to 24 VDC, 0.5 A	16 points, 1 common	Fujitsu connector	32	0.14	–	CJ1W-OD231 *3	
		Sinking	32 outputs	12 to 24 VDC, 0.5 A	16 points, 1 common	MIL connector	32	0.14	–	CJ1W-OD233 *2, *3	
		Sinking	32 outputs High-speed type	24 VDC, 0.5 A	16 points, 1 common	MIL connector	32	0.22	–	CJ1W-OD234 *2, *3	
		Sinking	64 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common	Fujitsu connector	64	0.17	–	CJ1W-OD261 *3	
		Sinking	64 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common	MIL connector	64	0.17	–	CJ1W-OD263 *3	
		Sourcing	8 outputs	24 VDC, 2 A Short-circuit protection	4 points, 1 common	Removable terminal block	16 *1	0.11	–	CJ1W-OD202	
		Sourcing	8 outputs	24 VDC, 0.5 A Short-circuit protection	8 points, 1 common	Removable terminal block	16 *1	0.10	–	CJ1W-OD204	
		Sourcing	16 outputs	24 VDC, 0.5 A Short-circuit protection	16 points, 1 common	Removable terminal block	16	0.10	–	CJ1W-OD212	
		Sourcing	32 outputs	24 VDC, 0.5 A Short-circuit protection	16 points, 1 common	MIL connector	32	0.15	–	CJ1W-OD232 *3	
		Sourcing	64 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common	MIL connector	64	0.17	–	CJ1W-OD262 *3	

*1 Although 16 I/O bits are allocated, only 8 of these can be used for external I/O. These Units are also treated as 16-point I/O Units in the Unit configuration.

*2 The ON/OFF response time for the CJ1W-OD213/CJ1W-OD234 is shorter than for the CJ1W-OD211/CJ1WOD233, as shown below.
- ON response time: 0.1 ms improved to 0.015 ms
- OFF response time: 0.8 ms improved to 0.08 ms

*3 Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.

■ I/O Units

Unit classification	Product name	Specifications					Number of bits allocated	Current consumption (A)		Model	Standards
		Output type	I/O points	Input voltage, Input current / Maximum switching capacity	Commons	External connection		5 V	24 V		
CJ1 Basic I/O Units	DC Input/ Transistor Output Units	Sinking	16 inputs	24 VDC, 7 mA	16 points, 1 common	Fujitsu connector	32	0.13	---	CJ1W-MD231 *2	UC1, N, CE
			16 outputs	250 VAC/24 VDC, 0.5 A	16 points, 1 common						
		Sinking	16 inputs	24 VDC, 7 mA	16 points, 1 common	MIL connector	64	0.13	---	CJ1W-MD233 *2	UC1, N, CE
			16 outputs	12 to 24 VDC, 0.5 A	16 points, 1 common						
		Sinking	32 inputs	24 VDC, 4.1 mA	16 points, 1 common	Fujitsu connector	32	0.14	---	CJ1W-MD261 *1	
			32 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common						
		Sinking	32 inputs	24 VDC, 4.1 mA	16 points, 1 common	MIL connector	64	0.14	---	CJ1W-MD263 *1	
			32 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common						
		Sourcing	16 inputs	24 VDC, 7 mA	16 points, 1 common	MIL connector	32	0.13	---	CJ1W-MD232 *2	UC1, N, L, CE
			16 outputs	24 VDC, 0.5 A Short-circuit protection	16 points, 1 common						
	TTL I/O Units	---	32 inputs	5 VDC, 35 mA	16 points, 1 common	MIL connector	64	0.19	---	CJ1W-MD563 *1	UC1, N, CE
			32 outputs	5 VDC, 35 mA	16 points, 1 common						

*1 Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.
*2 Connectors are not provided with these connector models. Either purchase one of the following 20-pin or 24-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.

● Applicable Connectors

Fujitsu Connectors for 32-input, 32-output, 64-input, 64-output, 32-input/32-output, and 16-input/16-output Units

Name	Connection	Remarks	Applicable Units	Model	Standards
40-pin Connectors	Soldered	FCN-361J040-AU Connector FCN-360C040-J2 Connector Cover	Fujitsu Connectors: CJ1W-ID231(32 inputs): 1 per Unit CJ1W-ID261 (64 inputs) 2 per Unit CJ1W-OD231 (32 outputs):1 per Unit CJ1W-OD261 (64 outputs): 2 per Unit CJ1W-MD261 (32 inputs, 32 outputs): 2 per Unit	C500-CE404	---
	Crimped	FCN-363J040 Housing FCN-363J-AU Contactor FCN-360C040-J2 Connector Cover		C500-CE405	
	Pressure welded	FCN-367J040-AU/F		C500-CE403	
24-pin Connectors	Soldered	FCN-361J024-AU Connector FCN-360C024-J2 Connector Cover	Fujitsu Connectors: CJ1W-MD231 (16 inputs, 16 outputs): 2 per Unit	C500-CE241	
	Crimped	FCN-363J024 Housing FCN-363J-AU Contactor FCN-360C024-J2 Connector Cover		C500-CE242	
	Pressure welded	FCN-367J024-AU/F		C500-CE243	

MIL Connectors for 32-input, 32-output, 64-input, 64-output, 32-input/32-output, and 16-input/16-output Units

Name	Connection	Remarks	Applicable Units	Model	Standards
40-pin Connectors	Pressure welded	FRC5-AO40-3TOS	MIL Connectors: CJ1W-ID232/233 (32 inputs): 1 per Unit CJ1W-OD232/233/234 (32 outputs):1 per Unit CJ1W-ID262 (64 inputs): 2 per Unit CJ1W-OD262/263 (64 outputs): 2 per Unit CJ1W-MD263/563 (32 inputs, 32 outputs): 2 per Unit	XG4M-4030-T	---
20-pin Connectors	Pressure welded	FRC5-AO20-3TOS	MIL Connectors: CJ1W-MD232/233 (16 inputs, 16 outputs): 2 per Unit	XG4M-2030-T	

■ Quick-response Input Units

Unit classification	Product name	Specifications				Number of bits allocated	Response time		Current consumption (A)		Model	Standards
		I/O points	Input voltage, Input current	Commons	External connection		ON	OFF	5 V	24 V		
CJ1 Basic I/O Units	Quick-response Input Unit	16 inputs	24 VDC, 7 mA	16 points, 1 common	Removable terminal block	16	0.05 ms max.	0.5 ms max.	0.08	---	CJ1W-IDP01	UC1, N, L, CE

■ B7A Interface Units

Unit classification	Product name	Specifications		Number of bits allocated	Current consumption (A)		Model	Standards
		I/O points	External connection		5 V	24 V		
CJ1 Basic I/O Units	B7A Interface Units	64 inputs	Removable terminal block	64	0.07	---	CJ1W-B7A14	UC1, CE
		64 outputs			0.07	---	CJ1W-B7A04	
		32 inputs/outputs			0.07	---	CJ1W-B7A22	

Special I/O Units and CPU Bus Units

■ Process I/O Units

● Isolated-type Units with Universal Inputs

Unit classification	Product name	Input points	Signal range selection	Signal range	Conversion speed (resolution)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
									5 V	24 V		
CJ1 Special I/O Units	Process Input Units (Isolated-type Units with Universal Inputs)	4 inputs	Set separately for each input	Universal inputs: Pt100 (3-wire), JPt100 (3-wire), Pt1000 (3-wire), Pt100 (4-wire), K, J, T, E, L, U, N, R, S, B, WRe5-26, PL II, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, ±100 mV selectable range −1.25 to 1.25 V, −5 to 5 V, −10 to 10 V, ±10 V selectable range, potentiometer	Resolution (conversion speed): 1/256,000 (conversion cycle: 60 ms/ 4 inputs) 1/64,000 (conversion cycle: 10 ms/ 4 inputs) 1/16,000 (conversion cycle: 5 ms/ 4 inputs)	Standard accuracy: ±0.05% of F.S.	Removable terminal block	1	0.30	---	CJ1W-PH41U *1	UC1, CE
		4 inputs	Set separately for each input	Universal inputs: Pt100, JPt100, Pt1000, K, J, T, L, R, S, B, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V	Conversion speed: 250 ms/ 4 inputs	Accuracy: Platinum resistance thermometer input: (±0.3% of PV or ±0.8°C, whichever is larger) ±1 digit max. Thermocouple input: (±0.3% of PV or ±1.5°C, whichever is larger) ±1 digit max. *2 Voltage or current input: ±0.3% of F.S. ±1 digit max.			0.32	---	CJ1W-AD04U	UC1, L, CE

*1 Do not connect a Relay Output Unit to the same CPU Rack or to the same Expansion Rack as the CJ1W-PH41U.
*2 L and −100°C or less for K and T are ±2°C±1 digit max., and 200°C or less for R and S is ±3°C±1 digit max. No accuracy is specified for 400°C or less for B.

● Isolated-type DC Input Units

Unit classification	Product name	Input points	Signal range selection	Conversion speed (resolution)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
								5 V	24 V		
CJ1 Special I/O Units	Isolated-type DC Input Units	2 inputs	DC voltage: 0 to 1.25 V, −1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, −5 to 5 V, 0 to 10 V, −10 to 10 V, ±10 V selectable range DC current: 0 to 20 mA, 4 to 20 mA	Conversion speed: 10 ms/ 2 inputs Resolution: 1/64,000	Standard accuracy: ±0.05% of F.S.	Removable terminal block	1	0.18	0.09 *	CJ1W-PDC15	UC1, CE

* This is for an external power supply, and not for internal current consumption.

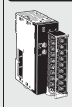
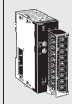
■ Analog I/O Units

● Analog Input Units

Unit classification	Product name	Input points	Signal range selection	Signal range	Resolution	Conversion speed	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A) 5 V	Current consumption (A) 24 V	Model	Standards
CJ1 Special I/O Units	Analog Input Units High-speed type	4 inputs	Set separately for each input	1 to 5 V (1/10,000), 0 to 10 V (1/20,000), −5 to 5 V (1/20,000), −10 to 10 V (1/40,000), and 4 to 20 mA (1/10,000)		20 µs/1 point, 25 µs/2 points, 30 µs/3 points, 35 µs/4 points	Voltage: ±0.2% of F.S. Current: ±0.4% of F.S.	Removable terminal block	1	0.52	---	CJ1W-AD042 *1	UC1, CE
	Analog Input Units	8 inputs		1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA	1/4000, (Settable to 1/8000) *2	1 ms/point max. (Settable to 250 µs/point) *2	Voltage: ±0.2% of F.S. Current: ±0.4% of F.S. *3			0.42	---	CJ1W-AD081-V1	UC1, N, L, CE
		4 inputs								0.42	---	CJ1W-AD041-V1	

*1 The direct conversion function using the AIDC instruction cannot be used.
*2 The resolution and conversion speed cannot be set independently. If the resolution is set to 1/4,000, then the conversion speed will be 1 ms/point.
*3 At 23 ±2°C

● Analog Output Units

Unit classification	Product name	Output points	Signal range selection	Signal range	Resolution	Conversion speed	Accuracy (at ambient temperature of 25°C)	External connection	External power supply	No. of unit numbers allocated	Current consumption (A) 5 V	Current consumption (A) 24 V	Model	Standards
CJ1 Special I/O Units	Analog Output Units High-speed type 	4 outputs	Set separately for each input	1 to 5 V (1/10,000), 0 to 10 V (1/20,000), and −10 to 10 V (1/40,000)		20 µs/1 point, 25 µs/2 points, 30 µs/3 points, 35 µs/4 points	±0.3% of F.S.	Removable terminal block	---	1	0.40	---	CJ1W-DA042V *1	UC1, CE
	Analog Output Units 	8 outputs		1 to 5 V, 0 5 to 5 V, 0 to 10 V, −10 to 10 V	1/4,000 (Settable to 1/8,000)	1 ms/point max. (Settable to 250 µs/point)			24 VDC +10% −15%, 140 mA max.		0.14	0.14 *2	CJ1W-DA08V	UC1, N, L, CE
		8 outputs		4 to 20 mA					24 VDC +10% −15%, 170 mA max.		0.14	0.17 *2	CJ1W-DA08C	UC1, N, CE
		4 outputs		1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA	1/4000	1 ms/point max.	Voltage output: ±0.3% of F.S. Current output: ±0.5% of F.S.		24 VDC +10% −15%, 200 mA max.		0.12	0.2 *2	CJ1W-DA041	UC1, N, L, CE
		2 outputs							24 VDC +10% −15%, 140 mA max.		0.12	0.14 *2	CJ1W-DA021	

*1 The direct conversion function using the AODC instruction cannot be used.
*2 This is for an external power supply, and not for internal current consumption

● Analog I/O Units

Unit classification	Product name	No. of points	Signal range selection	Signal range	Resolution (See note.)	Conversion speed (See note.)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
										5 V	24 V		
CJ1 Special I/O Units	Analog I/O Units	4 inputs	Set separately for each input	1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA	1/4,000 (Settable to 1/8,000)	1 ms/point (Settable to 500 μs/point max.)	Voltage input: ±0.2% of F.S. Current input: ±0.2% of F.S.	Removable terminal block	1	0.58	---	CJ1W-MAD42	UC1, N, L, CE
		2 outputs					Voltage output: ±0.3% of F.S. Current output: ±0.3% of F.S.						

Note: The resolution and conversion speed cannot be set independently. If the resolution is set to 1/4,000, then the conversion speed will be 1 ms/point.

■ Temperature Control Units

Unit classification	Product name	Specifications			No. of unit numbers allocated	Current consumption (A)		Model	Standards
		No. of loops	Temperature sensor inputs	Control outputs		5 V	24 V		
CJ1 Special I/O Units	Temperature Control Units	2 loops, heater burnout detection function	Thermocouple input (R, S, K, J, T, B, L)	Open collector NPN outputs (pulses)	2	0.25	---	CJ1W-TC003	UC1, N, L, CE
				Open collector PNP outputs (pulses)		0.25	---	CJ1W-TC004	
			Platinum resistance thermometer input (JPt100, Pt100)	Open collector NPN outputs (pulses)		0.25	---	CJ1W-TC103	
				Open collector PNP outputs (pulses)		0.25	---	CJ1W-TC104	

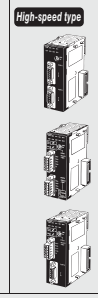
■ High-speed Counter Unit

Unit classification	Product name	Specifications			No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Countable channels	Encoder A and B inputs, pulse input Z signals	Max. counting rate		5 V	24 V		
CJ1 Special I/O Units	High-speed Counter Unit	2	Open collector Input voltage: 5 VDC, 12 V, or 24 V (5 V and 12 V are each for one axis only.)	50 kHz	4	0.28	---	CJ1W-CT021	UC1, N, L, CE
			RS-422 line driver	500 kHz					

Note: The following functions become unavailable when it is used with the NJ-Series CPU unit.

- Counter value capture using allocation area(CIO)
- The capture, Stop/capture/continue, Stop/capture/reset/continue, and Capture/reset functions using External Control Input Function
- Pulse rate range control using Output Control Mode
- The pulse rate measurement function
- Because the NJ-Series has no power OFF interrupt task, operation cannot be restarted from the position at which the power was interrupted.
- Read or write the data using IORD/IOWR instruction
- Starting of External Interrupt Task by Output and External Control Input

■ Serial Communications Units

Unit classification	Product name	Specifications		No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Communications Interface	Communications functions		5 V	24 V		
CJ1 CPU Bus Units	Serial Communications Units 	2 RS-232C ports	The following functions can be selected for each port: Protocol macro *1 Host Link NT Links (1:N mode) Serial Gateway No-protocol Modbus-RTU Slave	1	0.28 *2	---	CJ1W-SCU22	UC1, N, L, CE
		2 RS-422A/485 ports			0.40	---	CJ1W-SCU32	
		1 RS-232C port and 1 RS-422A/485 port			0.36 *2	---	CJ1W-SCU42	
RS-422A Converter		Converts RS-233C to RS-422A/RS-485.					CJ1W-CIF11	

Note: 1. Simple Backup Function and Interrupt notification function cannot be used.
2. For the communication specifications required for connection to existing equipment, consult with your OMRON representative.

*1 You can activate protocol macro trace function when the CPU Unit is set to the RUN Mode. (MONITOR Mode is not available with the NJ-Series CPU Units.)

*2 When an NT-AL001 RS-232C/RS-422A Conversion Unit is used, this value increases by 0.15 A/Unit. Add 0.20A/Unit when using NV3W-M□20L Programmable Terminals. Add 0.04A/Unit when using CJ1W-CIF11 RS-422A Adapters.

■ DeviceNet Unit

Unit classification	Product name	Specifications	Communications type	No. of unit numbers allocated	Current consumption (A)		Model	Standards
					5 V	24 V		
CJ1 CPU Bus Units	DeviceNet Unit	Functions as master and/or slave; allows control of 32,000 points max. per master.	• Remote I/O communications master (fixed or user-set allocations) • Remote I/O communications slave (fixed or user-set allocations) • Message communications	1	0.29	---	CJ1W-DRM21	UC1, N, L, CE

Note: 1. Simple backup function cannot be used.
2. DeviceNet configurator cannot be used. Use CX-Integrator.
3. For the communication specifications required for connection to existing equipment, consult with your OMRON representative.

■ ID Sensor Units

Unit classification	Product name	Specifications			No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Connected ID Systems	No. of connected R/W heads	External power supply		5 V	24 V		
CJ1 CPU Bus Units	ID Sensor Units	V680-Series RFID System	1	Not required.	1	0.26 *	0.13 *	CJ1W-V680C11	UC, CE
			2		2	0.32	0.26	CJ1W-V680C12	

Note: The data transfer function using intelligent I/O commands can not be used.

* To use a V680-H01 Antenna, refer to the V680 Series RFID System Catalog (Cat. No. Q151).

Peripheral Devices

■ EtherCAT junction slaves

Product name		No. of ports	Power supply voltage	Current consumption (A)	Model	Standards
EtherCAT junction slaves		3	20.4 to 28.8 VDC (24 VDC -15 to +20%)	0.08	GX-JC03	CE, UC1
		6		0.17	GX-JC06	

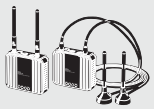
Note: 1. Please do not connect EtherCAT junction slaves with OMRON position control unit, Model CJ1W-NC□81/□82.
2. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.

■ Industrial Switching Hubs for EtherNet/IP and Ethernet

Product name		Specifications			Accessories	Current consumption (A)	Model	Standards
		Functions	No. of ports	Failure detection				
Industrial Switching Hubs		Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3	No	• Power supply connector	0.22	W4S1-03B	UC, CE
			5	No		0.22	W4S1-05B	
			5	Yes	• Power supply connector • Connector for informing error	0.22	W4S1-05C	CE

Note: Industrial switching hubs cannot be used for EtherCAT.

■ WE70 FA WIRELESS LAN UNITS

Product name	Applicable region	Type	Model	Standards
WE70 FA WIRELESS LAN UNITS 	Japan	Access Point (Master)	WE70-AP	---
		Client (Slave)	WE70-CL	
	Europe	Access Point (Master)	WE70-AP-EU	CE
		Client (Slave)	WE70-CL-EU	
	U.S	Access Point (Master)	WE70-AP-US	UC
		Client (Slave)	WE70-CL-US	
	Canada	Access Point (Master)	WE70-AP-CA	
		Client (Slave)	WE70-CL-CA	
	China	Access Point (Master)	WE70-AP-CN	---
		Client (Slave)	WE70-CL-CN	

Note: 1. A Pencil Antenna, mounting magnet, and screw mounting bracket are included as accessories.
2. Always use a model that is applicable in your region. For example, using the WE70-AP-US outside of the United States is illegal in terms of the usage of electromagnetic waves. Refer to the WE70 Catalog (Cat. No. N154).

Ordering Information

Automation Software

Please purchase a DVD and licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually.
The license does not include the DVD.

Product	Specifications			Model	Standards
		Number of licenses	Media		
Sysmac Studio Standard Edition Ver.1.□□	The Sysmac Studio Automation Software provides an integrated development environment to set up, program, debug, and maintain SYSMAC NJ-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher), Vista, or 7	– (Media only)	DVD	**SYSMAC-SE200D**	–
		1 license	–	**SYSMAC-SE201L**	–
		3 licenses	–	**SYSMAC-SE203L**	–
		10 licenses	–	**SYSMAC-SE210L**	–
		30 licenses	–	**SYSMAC-SE230L**	–
		50 licenses	–	**SYSMAC-SE250L**	–

Note: Site licenses are available for users who will run Sysmac Studio on multiple computers. Ask your OMRON sales representative for details.

Components

DVD (SYSMAC-SE200D)

Components	Description
Introduction	An introduction about components, installation/uninstallation, user registration and auto update of the Sysmac Studio is provided.
Setup disk (DVD-ROM)	1

License (SYSMAC-SE2□□L)

Components	Description
License Agreement	The license agreement gives the usage conditions and warranty for the Sysmac Studio.
License Card	A model number, version, license number, and number of licenses are described.
User Registration Card	Two cards are contained. One is for users in Japan and the other is for users in other countries.

Included Support Software

Sysmac Studio includes the following software.

Included Support Software		Outline
CX-Designer	**Ver.3.□**	The CX-Designer is used to create screens for NS-Series PTs.
CX-Integrator	**Ver.2.□**	The CX-Integrator is used to set up FA networks.
CX-Protocol	**Ver.1.□**	The CX-Protocol is used for protocol macros for Serial Communications Units.
Network Configurator	**Ver.3.□**	The Network Configurator is used for tag data links on the built-in EtherNet/IP port.

Interpreting Model Numbers

Servo Drive Model Numbers

R88D-K N 01 H -ECT

(1) (2) (3) (4) (5)

No	Item	Symbol	Specifications
(1)	G5-Series Servo Drive		
(2)	Drive Type	N	Communication type
(3)	Maximum Applicable Servomotor Capacity	A5	50 W
		01	100 W
		02	200 W
		04	400 W
		06	600 W
		08	750 W
		10	1 W
		15	1.5 kW
		20	2 kW
		30	3 kW
		40	4 kW
		50	5 kW
		75	7.5 kW
		150	15 kW
(4)	Power Supply Voltage	L	100 VAC
		H	200 VAC
		F	400 VAC
(5)	Network type	-ECT	EtherCAT Communications

Servomotor Model Numbers

R88M-K □ 750 30 H -BO S2

(1) (2) (3) (4) (5) (6)

No	Item	Symbol	Specifications
(1)	G5-Series Servomotor		
(2)	Motor Type	Blank	Cylinder type
		–	–
(3)	Servomotor Capacity	050	50 W
		100	100 W
		200	200 W
		400	400 W
		600	600 W
		750	750 W
		900	900 W
		1K0	1 kW
		1K5	1.5 kW
		2K0	2 kW
		3K0	3 kW
		4K0	4 kW
		4K5	4.5 kW
		5K0	5 kW
		6K0	6 kW
		7K5	7.5 kW
		11K0	11 kW
		15K0	15 kW
(4)	Rated Rotation Speed	10	1,000 r/min
		15	1,500 r/min
		20	2,000 r/min
		30	3,000 r/min
(5)	Applied Voltage	F	400 VAC (with incremental encoder specifications) INC
		H	200 VAC (with incremental encoder specifications) INC
		L	100 VAC (with incremental encoder specifications) INC
		C	400 VAC (with absolute encoder specifications) ABS/INC
		T	200VAC (with absolute encoder specifications) ABS/INC
		S	100 VAC (with absolute encoder specifications) ABS/INC
(6)	Option	Blank	Straight shaft
		B	With brake
		O	With oil seal
		S2	With key and tap

Note: INC incremental encoder: 20bit
ABS/INC incremental encoder: 17bit, absolute encoder: 17bit

Understanding Decelerator Model Numbers (Backlash = 3' Max./Backlash = 15' Max.)

Backlash = 3' Max.

R88G-HPG 14A 05 100 S B J

(1) (2) (3) (4) (5) (6) (7)

No	Item	Symbol	Specifications
(1)	Decelerator for G□-Series Servomotors Backlash = 3' Max.		
(2)	Flange Size Number	11B	□40
		14A	□60
		20A	□90
		32A	□120
		50A	□170
		65A	□230
(3)	Gear Ratio	05	1/5
		09	1/9 (only frame number 11B)
		11	1/11 (except frame number 65A)
		12	1/12 (only frame number 65A)
		20	1/20 (only frame number 65A)
		21	1/21 (except frame number 65A)
		25	1/25 (only frame number 65A)
		33	1/33
		45	1/45
(4)	Applicable Servomotor Capacity	050	50 W
		100	100 W
		200	200 W
		400	400 W
		750	750 W
		900	900 W
		1K0	1 kW
		1K5	1.5 kW
		2K0	2 kW
		3K0	3 kW
		4K0	4 kW
		4K5	4.5 kW
		5K0	5 kW
(5)	Motor Type	Blank	3,000-r/min cylindrical servomotors
		–	–
		S	2,000-r/min cylindrical servomotors
		T	1,000-r/min cylindrical servomotors
(6)	Backlash	B	Backlash = 3' Max
(7)	Option	Blank	Straight shaft
		J	With key and tap

Backlash = 15' Max.

R88G-VRSF 09 B 100 C J

(1) (2) (3) (4) (5) (6) (7)

No	Item	Symbol	Specifications
(1)	Decelerator for G□-Series Servomotors Backlash = 15' Max.		
(2)	Gear Ratio	05	1/5
		09	1/9
		15	1/15
		25	1/25
(3)	Flange Size Number	B	□52
		C	□78
		D	□98
(4)	Applicable Servomotor Capacity	050	50 W
		100	100 W
		200	200 W
		400	400 W
		750	750 W
(5)	Motor Type	Blank	3,000-r/min cylindrical servomotors
		–	–
(6)	Backlash	C	Backlash = 15' Max
(7)	Option	J	With key (without tap)

Table of Servomotor Variations

R88M-K□□□□□□-□□□□
(3) (4) (5) (6) (7) (8) (9)

(3)	(4)	(5)	Model	(6)						(7)		(8)		(9)	
Type	Applicable Servomotor Capacity	Rotation speed		Applied Voltage						With brake / Without brake		Models with oil seals		Shaft type	
				INC	INC	INC	ABS	ABS	ABS						
				400	200	100	400	200	100	–	B				
				F	H	L	C	T	S	Blank	With brake	Blank	O	Blank	S2
Cylinder	50 W	3,000 r/min	R88M-K05030 *1		√			√		√	√	√	√	√	√
	100 W		R88M-K10030		√	√		√	√	√	√	√	√	√	√
	200 W		R88M-K20030		√	√		√	√	√	√	√	√	√	√
	400 W		R88M-K40030		√	√		√	√	√	√	√	√	√	√
	750 W		R88M-K75030	√	√		√	√		√	√	√	√	√	√
	1 kW		R88M-K1K030	√	√		√	√		√	√	√	√	√	√
	1.5 kW		R88M-K1K530	√	√		√	√		√	√	√	√	√	√
	2 kW		R88M-K2K030	√	√		√	√		√	√	√	√	√	√
	3 kW		R88M-K3K030	√	√		√	√		√	√	√	√	√	√
	4 kW		R88M-K4K030	√	√		√	√		√	√	√	√	√	√
	5 kW		R88M-K5K030	√	√		√	√		√	√	√	√	√	√
	400 W	2,000 r/min	R88M-K40020	√			√			√	√	√	√	√	√
	600 W		R88M-K60020	√			√			√	√	√	√	√	√
	1 kW		R88M-K1K020	√	√		√	√		√	√	√	√	√	√
	1.5 kW		R88M-K1K520	√	√		√	√		√	√	√	√	√	√
	2 kW		R88M-K2K020	√	√		√	√		√	√	√	√	√	√
	3 kW		R88M-K3K020	√	√		√	√		√	√	√	√	√	√
	4 kW		R88M-K4K020	√	√		√	√		√	√	√	√	√	√
	5 kW		R88M-K5K020	√	√		√	√		√	√	√	√	√	√
	7.5 kW		R88M-K7K515 *2				√	√		√	√	√	√	√	√
	11 kW		R88M-K11K015 *2				√	√		√	√	√	√	√	√
	15 kW		R88M-K15K015 *2				√	√		√	√	√	√	√	√
	900 W	1,000 r/min	R88M-K90010	√	√		√	√		√	√	√	√	√	√
	2 kW		R88M-K2K010	√	√		√	√		√	√	√	√	√	√
	3 kW		R88M-K3K010	√	√		√	√		√	√	√	√	√	√
	4.5 kW		R88M-K4K510				√	√		√	√	√	√	√	√
	6 kW		R88M-K6K010				√	√		√	√	√	√	√	√
Blank: Cylinder type	example 030: 30 W 100: 100 W 1K0: 1 kW	10: 1,000 r/min 20: 2,000 r/min 30: 3,000 r/min		F: 400 VAC (with incremental encoder) INC H: 200 VAC (with incremental encoder) INC L: 100 VAC (with incremental encoder) INC C: 400 VAC (with absolute encoder) ABS/INC T: 200 VAC (with absolute encoder) ABS/INC S: 100 VAC (with absolute encoder) ABS/INC						Blank: Without brake B: 24 VDC With brake		Blank: Without oil seals O: With oil seals		Blank: Straight shaft S2: With key and tap	

*1 R88M-K05030H-□, R88M-K05030T-□, can be used for Power Supply Voltage of 100/200VAC.
*2 The rated speed is 1,500 r/min.

Ordering Information

AC Servo Drives

EtherCAT Communications

Specifications		Model
Power Model Supply Voltage	Applicable Servomotor Capacity	
Single-phase 100 VAC	50 W	R88D-KNA5L-ECT
	100 W	R88D-KN01L-ECT
	200 W	R88D-KN02L-ECT
	400 W	R88D-KN04L-ECT
Single-phase/three-phase 200 VAC	100 W	R88D-KN01H-ECT
	200 W	R88D-KN02H-ECT
	400 W	R88D-KN04H-ECT
	750 W	R88D-KN08H-ECT
	1 kW	R88D-KN10H-ECT
	1.5 kW	R88D-KN15H-ECT
Three-phase 200 VAC	2 kW	R88D-KN20H-ECT
	3 kW	R88D-KN30H-ECT
	5 kW	R88D-KN50H-ECT
	7.5 kW	R88D-KN75H-ECT
	15 kW	R88D-KN150H-ECT
Three-phase 400 VAC	600 W	R88D-KN06F-ECT
	1 kW	R88D-KN10F-ECT
	1.5 kW	R88D-KN15F-ECT
	2 kW	R88D-KN20F-ECT
	3 kW	R88D-KN30F-ECT
	5 kW	R88D-KN50F-ECT
	7.5 kW	R88D-KN75F-ECT
	15 kW	R88D-KN150F-ECT

Note: When connecting a Servo Drive to the NJ-Series Machine Automation Controller, it is recommended that you use the Servo Drive with Built-in EtherCAT Communications, R88D-KN□□□-ECT, with unit version 2.1 or later.

Servomotors

<Cylinder Type>
3,000-r/min servomotors

Rotation speed	Encoder	Option
3,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030H
		100 W	R88M-K10030L
		200 W	R88M-K20030L
		400 W	R88M-K40030L
	200 V	50 W	R88M-K05030H
		100 W	R88M-K10030H
		200 W	R88M-K20030H
		400 W	R88M-K40030H
		750 W	R88M-K75030H
		1 kW	R88M-K1K030H
		1.5 kW	R88M-K1K530H
		2 kW	R88M-K2K030H
		3 kW	R88M-K3K030H
		4 kW	R88M-K4K030H
		5 kW	R88M-K5K030H
	400 V	750 W	R88M-K75030F
		1 kW	R88M-K1K030F
		1.5 kW	R88M-K1K530F
		2 kW	R88M-K2K030F
		3 kW	R88M-K3K030F
		4 kW	R88M-K4K030F
		5 kW	R88M-K5K030F
With brake	100 V	50 W	R88M-K05030H-B
		100 W	R88M-K10030L-B
		200 W	R88M-K20030L-B
		400 W	R88M-K40030L-B
	200 V	50 W	R88M-K05030H-B
		100 W	R88M-K10030H-B
		200 W	R88M-K20030H-B
		400 W	R88M-K40030H-B
		750 W	R88M-K75030H-B
		1 kW	R88M-K1K030H-B
		1.5 kW	R88M-K1K530H-B
		2 kW	R88M-K2K030H-B
		3 kW	R88M-K3K030H-B
		4 kW	R88M-K4K030H-B
		5 kW	R88M-K5K030H-B
	400 V	750 W	R88M-K75030F-B
		1 kW	R88M-K1K030F-B
		1.5 kW	R88M-K1K530F-B
		2 kW	R88M-K2K030F-B
		3 kW	R88M-K3K030F-B
		4 kW	R88M-K4K030F-B
		5 kW	R88M-K5K030F-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
3,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030H-S2
		100 W	R88M-K10030L-S2
		200 W	R88M-K20030L-S2
		400 W	R88M-K40030L-S2
	200 V	50 W	R88M-K05030H-S2
		100 W	R88M-K10030H-S2
		200 W	R88M-K20030H-S2
		400 W	R88M-K40030H-S2
		750 W	R88M-K75030H-S2
		1 kW	R88M-K1K030H-S2
		1.5 kW	R88M-K1K530H-S2
		2 kW	R88M-K2K030H-S2
		3 kW	R88M-K3K030H-S2
		4 kW	R88M-K4K030H-S2
		5 kW	R88M-K5K030H-S2
	400 V	750 W	R88M-K75030F-S2
		1 kW	R88M-K1K030F-S2
		1.5 kW	R88M-K1K530F-S2
		2 kW	R88M-K2K030F-S2
		3 kW	R88M-K3K030F-S2
		4 kW	R88M-K4K030F-S2
		5 kW	R88M-K5K030F-S2
With brake	100 V	50 W	R88M-K05030H-BS2
		100 W	R88M-K10030L-BS2
		200 W	R88M-K20030L-BS2
		400 W	R88M-K40030L-BS2
	200 V	50 W	R88M-K05030H-BS2
		100 W	R88M-K10030H-BS2
		200 W	R88M-K20030H-BS2
		400 W	R88M-K40030H-BS2
		750 W	R88M-K75030H-BS2
		1 kW	R88M-K1K030H-BS2
		1.5 kW	R88M-K1K530H-BS2
		2 kW	R88M-K2K030H-BS2
		3 kW	R88M-K3K030H-BS2
		4 kW	R88M-K4K030H-BS2
		5 kW	R88M-K5K030H-BS2
	400 V	750 W	R88M-K75030F-BS2
		1 kW	R88M-K1K030F-BS2
		1.5 kW	R88M-K1K530F-BS2
		2 kW	R88M-K2K030F-BS2
		3 kW	R88M-K3K030F-BS2
		4 kW	R88M-K4K030F-BS2
		5 kW	R88M-K5K030F-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
3,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030T
		100 W	R88M-K10030S
		200 W	R88M-K20030S
		400 W	R88M-K40030S
	200 V	50 W	R88M-K05030T
		100 W	R88M-K10030T
		200 W	R88M-K20030T
		400 W	R88M-K40030T
		750 W	R88M-K75030T
		1 kW	R88M-K1K030T
		1.5 kW	R88M-K1K530T
		2 kW	R88M-K2K030T
		3 kW	R88M-K3K030T
		4 kW	R88M-K4K030T
		5 kW	R88M-K5K030T
	400 V	750 W	R88M-K75030C
		1 kW	R88M-K1K030C
		1.5 kW	R88M-K1K530C
		2 kW	R88M-K2K030C
		3 kW	R88M-K3K030C
		4 kW	R88M-K4K030C
		5 kW	R88M-K5K030C
With brake	100 V	50 W	R88M-K05030T-B
		100 W	R88M-K10030S-B
		200 W	R88M-K20030S-B
		400 W	R88M-K40030S-B
	200 V	50 W	R88M-K05030T-B
		100 W	R88M-K10030T-B
		200 W	R88M-K20030T-B
		400 W	R88M-K40030T-B
		750 W	R88M-K75030T-B
		1 kW	R88M-K1K030T-B
		1.5 kW	R88M-K1K530T-B
		2 kW	R88M-K2K030T-B
		3 kW	R88M-K3K030T-B
		4 kW	R88M-K4K030T-B
		5 kW	R88M-K5K030T-B
	400 V	750 W	R88M-K75030C-B
		1 kW	R88M-K1K030C-B
		1.5 kW	R88M-K1K530C-B
		2 kW	R88M-K2K030C-B
		3 kW	R88M-K3K030C-B
		4 kW	R88M-K4K030C-B
		5 kW	R88M-K5K030C-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
3,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft withkey and tap
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030T-S2
		100 W	R88M-K10030S-S2
		200 W	R88M-K20030S-S2
		400 W	R88M-K40030S-S2
	200 V	50 W	R88M-K05030T-S2
		100 W	R88M-K10030T-S2
		200 W	R88M-K20030T-S2
		400 W	R88M-K40030T-S2
		750 W	R88M-K75030T-S2
		1 kW	R88M-K1K030T-S2
		1.5 kW	R88M-K1K530T-S2
		2 kW	R88M-K2K030T-S2
		3 kW	R88M-K3K030T-S2
		4 kW	R88M-K4K030T-S2
		5 kW	R88M-K5K030T-S2
	400 V	750 W	R88M-K75030C-S2
		1 kW	R88M-K1K030C-S2
		1.5 kW	R88M-K1K530C-S2
		2 kW	R88M-K2K030C-S2
		3 kW	R88M-K3K030C-S2
		4 kW	R88M-K4K030C-S2
		5 kW	R88M-K5K030C-S2
With brake	100 V	50 W	R88M-K05030T-BS2
		100 W	R88M-K10030S-BS2
		200 W	R88M-K20030S-BS2
		400 W	R88M-K40030S-BS2
	200 V	50 W	R88M-K05030T-BS2
		100 W	R88M-K10030T-BS2
		200 W	R88M-K20030T-BS2
		400 W	R88M-K40030T-BS2
		750 W	R88M-K75030T-BS2
		1 kW	R88M-K1K030T-BS2
		1.5 kW	R88M-K1K530T-BS2
		2 kW	R88M-K2K030T-BS2
		3 kW	R88M-K3K030T-BS2
		4 kW	R88M-K4K030T-BS2
		5 kW	R88M-K5K030T-BS2
	400 V	750 W	R88M-K75030C-BS2
		1 kW	R88M-K1K030C-BS2
		1.5 kW	R88M-K1K530C-BS2
		2 kW	R88M-K2K030C-BS2
		3 kW	R88M-K3K030C-BS2
		4 kW	R88M-K4K030C-BS2
		5 kW	R88M-K5K030C-BS2

Note: Models with oil seals are also available.

2,000-r/min servomotors

Rotation speed	Encoder	Option
2,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model: With incremental encoder, Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020H
		1.5 kW	R88M-K1K520H
		2 kW	R88M-K2K020H
		3 kW	R88M-K3K020H
		4 kW	R88M-K4K020H
		5 kW	R88M-K5K020H
	400 V	400 W	R88M-K40020F
		600 W	R88M-K60020F
		1 kW	R88M-K1K020F
		1.5 kW	R88M-K1K520F
		2 kW	R88M-K2K020F
		3 kW	R88M-K3K020F
		4 kW	R88M-K4K020F
		5 kW	R88M-K5K020F
With brake	200 V	1 kW	R88M-K1K020H-B
		1.5 kW	R88M-K1K520H-B
		2 kW	R88M-K2K020H-B
		3 kW	R88M-K3K020H-B
		4 kW	R88M-K4K020H-B
		5 kW	R88M-K5K020H-B
	400 V	400 W	R88M-K40020F-B
		600 W	R88M-K60020F-B
		1 kW	R88M-K1K020F-B
		1.5 kW	R88M-K1K520F-B
		2 kW	R88M-K2K020F-B
		3 kW	R88M-K3K020F-B
		4 kW	R88M-K4K020F-B
		5 kW	R88M-K5K020F-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
2,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model: With incremental encoder, Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020H-S2
		1.5 kW	R88M-K1K520H-S2
		2 kW	R88M-K2K020H-S2
		3 kW	R88M-K3K020H-S2
		4 kW	R88M-K4K020H-S2
		5 kW	R88M-K5K020H-S2
	400 V	400 W	R88M-K40020F-S2
		600 W	R88M-K60020F-S2
		1 kW	R88M-K1K020F-S2
		1.5 kW	R88M-K1K520F-S2
		2 kW	R88M-K2K020F-S2
		3 kW	R88M-K3K020F-S2
		4 kW	R88M-K4K020F-S2
		5 kW	R88M-K5K020F-S2
With brake	200 V	1 kW	R88M-K1K020H-BS2
		1.5 kW	R88M-K1K520H-BS2
		2 kW	R88M-K2K020H-BS2
		3 kW	R88M-K3K020H-BS2
		4 kW	R88M-K4K020H-BS2
		5 kW	R88M-K5K020H-BS2
	400 V	400 W	R88M-K40020F-BS2
		600 W	R88M-K60020F-BS2
		1 kW	R88M-K1K020F-BS2
		1.5 kW	R88M-K1K520F-BS2
		2 kW	R88M-K2K020F-BS2
		3 kW	R88M-K3K020F-BS2
		4 kW	R88M-K4K020F-BS2
		5 kW	R88M-K5K020F-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
2,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020T
		1.5 kW	R88M-K1K520T
		2 kW	R88M-K2K020T
		3 kW	R88M-K3K020T
		4 kW	R88M-K4K020T
		5 kW	R88M-K5K020T
		7.5 kW	R88M-K7K515T *
		11 kW	R88M-K11K015T *
		15 kW	R88M-K15K015T *
	400 V	400 W	R88M-K40020C
		600 W	R88M-K60020C
		1 kW	R88M-K1K020C
		1.5 kW	R88M-K1K520C
		2 kW	R88M-K2K020C
		3 kW	R88M-K3K020C
		4 kW	R88M-K4K020C
		5 kW	R88M-K5K020C
		7.5 kW	R88M-K7K515C *
		11 kW	R88M-K11K015C *
		15 kW	R88M-K15K015C *
With brake	200 V	1 kW	R88M-K1K020T-B
		1.5 kW	R88M-K1K520T-B
		2 kW	R88M-K2K020T-B
		3 kW	R88M-K3K020T-B
		4 kW	R88M-K4K020T-B
		5 kW	R88M-K5K020T-B
		7.5 kW	R88M-K7K515T-B *
		11 kW	R88M-K11K015T-B *
		15 kW	R88M-K15K015T-B *
	400 V	400 W	R88M-K40020C-B
		600 W	R88M-K60020C-B
		1 kW	R88M-K1K020C-B
		1.5 kW	R88M-K1K520C-B
		2 kW	R88M-K2K020C-B
		3 kW	R88M-K3K020C-B
		4 kW	R88M-K4K020C-B
		5 kW	R88M-K5K020C-B
		7.5 kW	R88M-K7K515C-B *
		11 kW	R88M-K11K015C-B *
		15 kW	R88M-K15K015C-B *

Note: Models with oil seals are also available.
* The rated speed is 1,500 r/min.

Rotation speed	Encoder	Option
2,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020T-S2
		1.5 kW	R88M-K1K520T-S2
		2 kW	R88M-K2K020T-S2
		3 kW	R88M-K3K020T-S2
		4 kW	R88M-K4K020T-S2
		5 kW	R88M-K5K020T-S2
		7.5 kW	R88M-K7K515T-S2 *
		11 kW	R88M-K11K015T-S2 *
		15 kW	R88M-K15K015T-S2 *
	400 V	400 W	R88M-K40020C-S2
		600 W	R88M-K60020C-S2
		1 kW	R88M-K1K020C-S2
		1.5 kW	R88M-K1K520C-S2
		2 kW	R88M-K2K020C-S2
		3 kW	R88M-K3K020C-S2
		4 kW	R88M-K4K020C-S2
		5 kW	R88M-K5K020C-S2
		7.5 kW	R88M-K7K515C -S2 *
		11 kW	R88M-K11K015C-S2 *
		15 kW	R88M-K15K015C-S2 *
With brake	200 V	1 kW	R88M-K1K020T-BS2
		1.5 kW	R88M-K1K520T-BS2
		2 kW	R88M-K2K020T-BS2
		3 kW	R88M-K3K020T-BS2
		4 kW	R88M-K4K020T-BS2
		5 kW	R88M-K5K020T-BS2
		7.5 kW	R88M-K7K515T-BS2 *
		11 kW	R88M-K11K015T-BS2 *
		15 kW	R88M-K15K015T-BS2 *
	400 V	400 W	R88M-K40020C-BS2
		600 W	R88M-K60020C-BS2
		1 kW	R88M-K1K020C-BS2
		1.5 kW	R88M-K1K520C-BS2
		2 kW	R88M-K2K020C-BS2
		3 kW	R88M-K3K020C-BS2
		4 kW	R88M-K4K020C-BS2
		5 kW	R88M-K5K020C-BS2
		7.5 kW	R88M-K7K515C-BS2 *
		11 kW	R88M-K11K015C-BS2 *
		15 kW	R88M-K15K015C-BS2 *

Note: Models with oil seals are also available.
* The rated speed is 1,500 r/min.

1,000-r/min servomotors

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010H
		2 kW	R88M-K2K010H
		3 kW	R88M-K3K010H
	400 V	900 W	R88M-K90010F
		2 kW	R88M-K2K010F
		3 kW	R88M-K3K010F
With brake	200 V	900 W	R88M-K90010H-B
		2 kW	R88M-K2K010H-B
		3 kW	R88M-K3K010H-B
	400 V	900 W	R88M-K90010F-B
		2 kW	R88M-K2K010F-B
		3 kW	R88M-K3K010F-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010H-S2
		2 kW	R88M-K2K010H-S2
		3 kW	R88M-K3K010H-S2
	400 V	900 W	R88M-K90010F-S2
		2 kW	R88M-K2K010F-S2
		3 kW	R88M-K3K010F-S2
With brake	200 V	900 W	R88M-K90010H-BS2
		2 kW	R88M-K2K010H-BS2
		3 kW	R88M-K3K010H-BS2
	400 V	900 W	R88M-K90010F-BS2
		2 kW	R88M-K2K010F-BS2
		3 kW	R88M-K3K010F-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010T
		2 kW	R88M-K2K010T
		3 kW	R88M-K3K010T
		4.5 kW	R88M-K4K510T
		6 kW	R88M-K6K010T
	400 V	900 W	R88M-K90010C
		2 kW	R88M-K2K010C
		3 kW	R88M-K3K010C
		4.5 kW	R88M-K4K510C
		6 kW	R88M-K6K010C
With brake	200 V	900 W	R88M-K90010T-B
		2 kW	R88M-K2K010T-B
		3 kW	R88M-K3K010T-B
		4.5 kW	R88M-K4K510T-B
		6 kW	R88M-K6K010T-B
	400 V	900 W	R88M-K90010C-B
		2 kW	R88M-K2K010C-B
		3 kW	R88M-K3K010C-B
		4.5 kW	R88M-K4K510C-B
		6 kW	R88M-K6K010C-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010T-S2
		2 kW	R88M-K2K010T-S2
		3 kW	R88M-K3K010T-S2
		4.5 kW	R88M-K4K510T-S2
		6 kW	R88M-K6K010T-S2
	400 V	900 W	R88M-K90010C-S2
		2 kW	R88M-K2K010C-S2
		3 kW	R88M-K3K010C-S2
		4.5 kW	R88M-K4K510C-S2
		6 kW	R88M-K6K010C-S2
With brake	200 V	900 W	R88M-K90010T-BS2
		2 kW	R88M-K2K010T-BS2
		3 kW	R88M-K3K010T-BS2
		4.5 kW	R88M-K4K510T-BS2
		6 kW	R88M-K6K010T-BS2
	400 V	900 W	R88M-K90010C-BS2
		2 kW	R88M-K2K010C-BS2
		3 kW	R88M-K3K010C-BS2
		4.5 kW	R88M-K4K510C-BS2
		6 kW	R88M-K6K010C-BS2

Note: Models with oil seals are also available.

Decelerators (Backlash = 3' Max./Backlash = 15' Max.)

Backlash = 3' Max
<Cylinder Type>

3,000-r/min servomotors

Straight shaft without key

Motor capacity	Gear Ratio	Model (Straight shaft)
50 W	1/5	R88G-HPG11B05100B
	1/9	R88G-HPG11B09050B
	1/21	R88G-HPG14A21100B
	1/33	R88G-HPG14A33050B
	1/45	R88G-HPG14A45050B
100 W	1/5	R88G-HPG11B05100B
	1/11	R88G-HPG14A11100B
	1/21	R88G-HPG14A21100B
	1/33	R88G-HPG20A33100B
	1/45	R88G-HPG20A45100B
200 W	1/5	R88G-HPG14A05200B
	1/11	R88G-HPG14A11200B
	1/21	R88G-HPG20A21200B
	1/33	R88G-HPG20A33200B
	1/45	R88G-HPG20A45200B
400 W	1/5	R88G-HPG14A05400B
	1/11	R88G-HPG20A11400B
	1/21	R88G-HPG20A21400B
	1/33	R88G-HPG32A33400B
	1/45	R88G-HPG32A45400B
750 W (200 V)	1/5	R88G-HPG20A05750B
	1/11	R88G-HPG20A11750B
	1/21	R88G-HPG32A21750B
	1/33	R88G-HPG32A33750B
	1/45	R88G-HPG32A45750B
750W (400 V)	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG32A33600SB
	1/45	R88G-HPG50A451K5B
1kW	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG50A332K0B
	1/45	R88G-HPG50A451K5B
1.5kW	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG50A332K0B
	1/45	R88G-HPG50A451K5B
2kW	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG50A212K0B
	1/33	R88G-HPG50A332K0B
3kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG50A113K0B
	1/21	R88G-HPG50A213K0B
4kW	1/5	R88G-HPG32A054K0B
	1/11	R88G-HPG50A115K0B
5kW	1/5	R88G-HPG50A055K0B
	1/11	R88G-HPG50A115K0B

Note: 1. The standard models have a straight shaft.
2. To order a Servomotor with a straight shaft with key, add "J" to the end of the model number, in the place indicated by the box.

2,000-r/min servomotors

Straight shaft without key

Motor capacity	Gear Ratio	Model (Straight shaft)
400 W	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG32A33600SB
	1/45	R88G-HPG32A45400SB
600 W	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG32A33600SB
	1/45	R88G-HPG50A451K5B
1 kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG32A112K0SB
	1/21	R88G-HPG32A211K0SB
	1/33	R88G-HPG50A332K0SB
	1/45	R88G-HPG50A451K0SB
1.5 kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG32A112K0SB
	1/21	R88G-HPG50A213K0B
	1/33	R88G-HPG50A332K0SB
2 kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG32A112K0SB
	1/21	R88G-HPG50A213K0B
	1/33	R88G-HPG50A332K0SB
3 kW	1/5	R88G-HPG32A054K0B
	1/11	R88G-HPG50A115K0B
	1/21	R88G-HPG50A213K0SB
	1/25	R88G-HPG65A253K0SB
4 kW	1/5	R88G-HPG50A055K0SB
	1/11	R88G-HPG50A115K0SB
	1/20	R88G-HPG65A205K0SB
	1/25	R88G-HPG65A255K0SB
5 kW	1/5	R88G-HPG50A055K0SB
	1/11	R88G-HPG50A115K0SB
	1/20	R88G-HPG65A205K0SB
	1/25	R88G-HPG65A255K0SB

Note: 1. The standard models have a straight shaft.
2. To order a Servomotor with a straight shaft with key, add "J" to the end of the model number, in the place indicated by the box.

1,000-r/min servomotors

Straight shaft without key

Motor capacity	Gear Ratio	Model (Straight shaft)
900 W	1/5	R88G-HPG32A05900TB
	1/11	R88G-HPG32A11900TB
	1/21	R88G-HPG50A21900TB
	1/33	R88G-HPG50A33900TB
2 kW	1/5	R88G-HPG32A052K0TB
	1/11	R88G-HPG50A112K0TB
	1/21	R88G-HPG50A212K0TB
	1/25	R88G-HPG65A255K0SB
3 kW	1/5	R88G-HPG50A055K0SB
	1/11	R88G-HPG50A115K0SB
	1/20	R88G-HPG65A205K0SB
	1/25	R88G-HPG65A255K0SB

Note: 1. The standard models have a straight shaft.
2. To order a Servomotor with a straight shaft with key, add "J" to the end of the model number, in the place indicated by the box.

Backlash = 15' Max

<Cylinder Type>
3,000-r/min servomotors

Straight shaft with key

Motor capacity	Gear Ratio	Model (Straight shaft)
50 W	1/5	R88G-VRSF05B100CJ
	1/9	R88G-VRSF09B100CJ
	1/15	R88G-VRSF15B100CJ
	1/25	R88G-VRSF25B100CJ
100 W	1/5	R88G-VRSF05B100CJ
	1/9	R88G-VRSF09B100CJ
	1/15	R88G-VRSF15B100CJ
	1/25	R88G-VRSF25B100CJ
200 W	1/5	R88G-VRSF05B200CJ
	1/9	R88G-VRSF09C200CJ
	1/15	R88G-VRSF15C200CJ
	1/25	R88G-VRSF25C200CJ
400 W	1/5	R88G-VRSF05C400CJ
	1/9	R88G-VRSF09C400CJ
	1/15	R88G-VRSF15C400CJ
	1/25	R88G-VRSF25C400CJ
750 W	1/5	R88G-VRSF05C750CJ
	1/9	R88G-VRSF09D750CJ
	1/15	R88G-VRSF15D750CJ
	1/25	R88G-VRSF25D750CJ

Accessories and Cables

■ Connection Cables (Motor Power Cables, Brake Cables, Encoder Cables)

<Non-flexible Cable>

Motor Power Cables

Specifications		Without brake	With brake
		Model	Model
[100 V/200 V] 3,000-r/min Servomotors of 50 to 750 W	3 m	R88A-CAKA003S	(See note1.)
	5 m	R88A-CAKA005S	
	10 m	R88A-CAKA010S	
	15m	R88A-CAKA015S	
	20 m	R88A-CAKA020S	
	30 m	R88A-CAKA030S	
	40 m	R88A-CAKA040S	
	50 m	R88A-CAKA050S	
[200 V] 3,000-r/min Servomotors of 1 to 2 kW 2,000-r/min Servomotors of 1 to 2 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CAGB003S	R88A-CAGB003B
	5 m	R88A-CAGB005S	R88A-CAGB005B
	10 m	R88A-CAGB010S	R88A-CAGB010B
	15 m	R88A-CAGB015S	R88A-CAGB015B
	20 m	R88A-CAGB020S	R88A-CAGB020B
	30 m	R88A-CAGB030S	R88A-CAGB030B
	40 m	R88A-CAGB040S	R88A-CAGB040B
	50 m	R88A-CAGB050S	R88A-CAGB050B
[400 V] 3,000-r/min Servomotors of 750 W to 2 kW 2,000-r/min Servomotors of 400 W to 2 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CAGB003S	R88A-CAKF003B
	5 m	R88A-CAGB005S	R88A-CAKF005B
	10 m	R88A-CAGB010S	R88A-CAKF010B
	15 m	R88A-CAGB015S	R88A-CAKF015B
	20 m	R88A-CAGB020S	R88A-CAKF020B
	30 m	R88A-CAGB030S	R88A-CAKF030B
	40 m	R88A-CAGB040S	R88A-CAKF040B
	50 m	R88A-CAGB050S	R88A-CAKF050B
[200 V] [400 V] 3,000-r/min Servomotors of 3 to 5 kW 2,000-r/min Servomotors of 3 to 5 kW 1,000-r/min Servomotors of 2 to 4.5 kW	3 m	R88A-CAGD003S	R88A-CAGD003B
	5 m	R88A-CAGD005S	R88A-CAGD005B
	10 m	R88A-CAGD010S	R88A-CAGD010B
	15 m	R88A-CAGD015S	R88A-CAGD015B
	20 m	R88A-CAGD020S	R88A-CAGD020B
	30 m	R88A-CAGD030S	R88A-CAGD030B
	40 m	R88A-CAGD040S	R88A-CAGD040B
	50 m	R88A-CAGD050S	R88A-CAGD050B
[200 V] [400 V] 1,500-r/min Servomotors of 7.5 kW 1,000-r/min Servomotors of 6 kW	3 m	R88A-CAGE003S	
	5 m	R88A-CAGE005S	
	10 m	R88A-CAGE010S	
	15 m	R88A-CAGE015S	
	20 m	R88A-CAGE020S	
	30 m	R88A-CAGE030S	
	40 m	R88A-CAGE040S	
	50 m	R88A-CAGE050S	

Note: 1. Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.

2. For non-flexible power cables for Servomotors of 11 or 15 kW, refer to G5 series USER'S MANUAL (Cat.No. I576) and make your own cable.

Brake Cable

Specifications		Standard Cables
		Model
[100 V][200 V] 3,000-r/min Servomotors of 50 to 750 W	3 m	R88A-CAKA003B
	5 m	R88A-CAKA005B
	10 m	R88A-CAKA010B
	15 m	R88A-CAKA015B
	20 m	R88A-CAKA020B
	30 m	R88A-CAKA030B
	40 m	R88A-CAKA040B
	50 m	R88A-CAKA050B
[200 V][400 V] 1,500-r/min and 2,000-r/min Servomotors of 7.5 to 15 kW 1,000-r/min Servomotors of 6 kW	3 m	R88A-CAGE003B
	5 m	R88A-CAGE005B
	10 m	R88A-CAGE010B
	15 m	R88A-CAGE015B
	20 m	R88A-CAGE020B
	30 m	R88A-CAGE030B
	40 m	R88A-CAGE040B
	50 m	R88A-CAGE050B

Encoder Cable

Specifications		Standard Cables
		Model
[100 V/200 V] 3,000-r/min Servomotors of 50 to 750 W (for both absolute encoders and incremental encoders)	3 m	R88A-CRKA003C
	5 m	R88A-CRKA005C
	10 m	R88A-CRKA010C
	15 m	R88A-CRKA015C
	20 m	R88A-CRKA020C
	30 m	R88A-CRKA030C
	40 m	R88A-CRKA040C
	50 m	R88A-CRKA050C
[100 V and 200 V] 3,000-r/min Servomotors of 1.0 kW or more 2,000-r/min Servomotors 1,500-r/min Servomotors 1,000-r/min Servomotors [400 V] 3,000-r/min Servomotors 2,000-r/min Servomotors 1,500-r/min Servomotors 1,000-r/min Servomotors	3 m	R88A-CRKC003N
	5 m	R88A-CRKC005N
	10 m	R88A-CRKC010N
	15 m	R88A-CRKC015N
	20 m	R88A-CRKC020N
	30 m	R88A-CRKC030N
	40 m	R88A-CRKC040N
	50 m	R88A-CRKC050N

<Flexible Cables>

Motor Power Cables

Specifications		Without brake	With brake
		Model	Model
[100 V/200 V] 3,000-r/min Servomotors of 50 to 750 W	3 m	R88A-CAKA003SR(-E)	(See note1.)
	5 m	R88A-CAKA005SR(-E)	
	10 m	R88A-CAKA010SR(-E)	
	15 m	R88A-CAKA015SR(-E)	
	20 m	R88A-CAKA020SR(-E)	
	30 m	R88A-CAKA030SR(-E)	
	40 m	R88A-CAKA040SR(-E)	
	50 m	R88A-CAKA050SR(-E)	
[200 V] 3,000-r/min Servomotors of 1 to 2 kW 2,000-r/min Servomotors of 1 to 2 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CAGB003SR(-E)	R88A-CAGB003BR(-E)
	5 m	R88A-CAGB005SR(-E)	R88A-CAGB005BR(-E)
	10 m	R88A-CAGB010SR(-E)	R88A-CAGB010BR(-E)
	15 m	R88A-CAGB015SR(-E)	R88A-CAGB015BR(-E)
	20 m	R88A-CAGB020SR(-E)	R88A-CAGB020BR(-E)
	30 m	R88A-CAGB030SR(-E)	R88A-CAGB030BR(-E)
	40 m	R88A-CAGB040SR(-E)	R88A-CAGB040BR(-E)
	50 m	R88A-CAGB050SR(-E)	R88A-CAGB050BR(-E)
[400 V] 3,000-r/min Servomotors of 750 W to 2 kW 2,000-r/min Servomotors of 400 W to 2 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CAGB003SR(-E)	R88A-CAKF003BR(-E)
	5 m	R88A-CAGB005SR(-E)	R88A-CAKF005BR(-E)
	10 m	R88A-CAGB010SR(-E)	R88A-CAKF010BR(-E)
	15 m	R88A-CAGB015SR(-E)	R88A-CAKF015BR(-E)
	20 m	R88A-CAGB020SR(-E)	R88A-CAKF020BR(-E)
	30 m	R88A-CAGB030SR(-E)	R88A-CAKF030BR(-E)
	40 m	R88A-CAGB040SR(-E)	R88A-CAKF040BR(-E)
	50 m	R88A-CAGB050SR(-E)	R88A-CAKF050BR(-E)
[200 V] [400 V] 3,000-r/min Servomotors of 3 to 5 kW 2,000-r/min Servomotors of 3 to 5 kW 1,000-r/min Servomotors of 2 to 4.5 kW	3 m	R88A-CAGD003SR(-E)	R88A-CAGD003BR(-E)
	5 m	R88A-CAGD005SR(-E)	R88A-CAGD005BR(-E)
	10 m	R88A-CAGD010SR(-E)	R88A-CAGD010BR(-E)
	15 m	R88A-CAGD015SR(-E)	R88A-CAGD015BR(-E)
	20 m	R88A-CAGD020SR(-E)	R88A-CAGD020BR(-E)
	30 m	R88A-CAGD030SR(-E)	R88A-CAGD030BR(-E)
	40 m	R88A-CAGD040SR(-E)	R88A-CAGD040BR(-E)
	50 m	R88A-CAGD050SR(-E)	R88A-CAGD050BR(-E)

Note: 1. Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.

2. For flexible power cables for Servomotors of 11 or 15 kW, refer to G5 series USER'S MANUAL (Cat.No. I576) and make your own cable. For flexible motor power cables for Servomotors of 6 to 7.5kW, make your own cable by referring to the wirings of non-flexible motor power cables in the G5 series USER'S MANUAL (Cat.No.I576).

Brake Cable

Specifications		Robot Cables Model
[100 V] [200 V] 3,000-r/min Servomotors of 50 to 750 W	3 m	R88A-CAKA003BR(-E)
	5 m	R88A-CAKA005BR(-E)
	10 m	R88A-CAKA010BR(-E)
	15 m	R88A-CAKA015BR(-E)
	20 m	R88A-CAKA020BR(-E)
	30 m	R88A-CAKA030BR(-E)
	40 m	R88A-CAKA040BR(-E)
	50 m	R88A-CAKA050BR(-E)
[200 V] [400 V] 1,500-r/min and 2,000-r/min Servomotors of 7.5kW to 15kW 1,000-r/min Servomotors of 6.0kW	3 m	R88A-CAGE003BR(-E)
	5 m	R88A-CAGE005BR(-E)
	10 m	R88A-CAGE010BR(-E)
	15 m	R88A-CAGE015BR(-E)
	20 m	R88A-CAGE020BR(-E)
	30 m	R88A-CAGE030BR(-E)
	40 m	R88A-CAGE040BR(-E)
	50 m	R88A-CAGE050BR(-E)

Encoder Cable

Specifications		Robot Cables Model
[100 V/200 V] 3,000-r/min Servomotors of 50 to 750 W (for both absolute encoders and incremental encoders)	3 m	R88A-CRKA003CR(-E)
	5 m	R88A-CRKA005CR(-E)
	10 m	R88A-CRKA010CR(-E)
	15 m	R88A-CRKA015CR(-E)
	20 m	R88A-CRKA020CR(-E)
	30 m	R88A-CRKA030CR(-E)
	40 m	R88A-CRKA040CR(-E)
	50 m	R88A-CRKA050CR(-E)
[100 V and 200 V] 3,000-r/min Servomotors of 1.0 kW or more 2,000-r/min Servomotors 1,500-r/min Servomotors 1,000-r/min Servomotors [400 V] 3,000-r/min Servomotors 2,000-r/min Servomotors 1,500-r/min Servomotors 1,000-r/min Servomotors	3 m	R88A-CRKC003NR(-E)
	5 m	R88A-CRKC005NR(-E)
	10 m	R88A-CRKC010NR(-E)
	15 m	R88A-CRKC015NR(-E)
	20 m	R88A-CRKC020NR(-E)
	30 m	R88A-CRKC030NR(-E)
	40 m	R88A-CRKC040NR(-E)
	50 m	R88A-CRKC050NR(-E)

Control Cables

Control Cables (for Connector Terminal Block/CN1)

Name	Specifications			Model
Connector Terminal Block Cables	EtherCAT Communications		Length 1.0 m	**XW2Z-100J-B34**
			Length 2.0 m	**XW2Z-200J-B34**
Connector Terminal Block Conversion Unit	EtherCAT Communications	Conversion Unit for General-purpose Controllers (M3 screws)	Through type	**XW2B-20G4**
		Conversion Unit for General-purpose Controllers (M3.5 screws)	Through type	**XW2B-20G5**
		Conversion Unit for General-purpose Controllers (M3 screws)	Slim type	**XW2D-20G6**

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Cable/Connector
Absolute Encoder Backup Battery & Absolute Encoder Battery Cable

Description		Length	model
Absolute Encoder Battery Cable	Without Backup Battery	0.3 m	**R88A-CRGD0R3C**
	With Backup Battery	0.3 m	**R88A-CRGD0R3C-BS**
Absolute Encoder Backup Battery (2,000 mA ·3.6 V)		-	**R88A-BAT01G**

Cables

Description		Length	model
Analog Monitor Cables		1 m	**R88A-CMK001S**
General Purpose Control I/O Cables (CN1)	Network Communications Servodrive (R88D-KN□)	1 m	**R88A-CPKB001S-E**
		2 m	**R88A-CPKB002S-E**
External encoder cable (CN4)		5 m	**R88A-CRKM005SR-E**
		10 m	**R88A-CRKM010SR-E**
		20 m	**R88A-CRKM020SR-E**
Safety Connecting Cable (CN8)		3 m	**R88A-CSK003S-E**

Servo Drive Connectors

Description		Connects to	Model
Control I/O Connector	Network Communications Servodrive (R88D-KN□)	CN1	**R88A-CNW01C**
Main Circuit Power Supply Connector	[100VAC] 50W-400W [200VAC] 100W-1.5kW	CNA	**R88A-CNA02G-AP**
	[400VAC] 600W-1.5kW	CNA	**R88A-CNA01K-AP**
	[200VAC] 2.0kW	CNA	**R88A-CNA02K-AP**
	[400VAC] 2.0kW	CNA	**R88A-CNA03K-AP**
Servomotor Power Connector	[100VAC] 50W-400W [200VAC] 100W-1.5kW	CNB	**R88A-CNB01G-AP**
	[400VAC] 600W-1.5kW	CNB	**R88A-CNB01K-AP**
	[200VAC] 2.0kW [400VAC] 2.0kW	CNB	**R88A-CNB02K-AP**
24Vdc Control Circuit Connector	[400VAC] 600W-2.0kW	CNC	**R88A-CNC01K-AP**
Regenerative Resistor Connector	[400VAC] 600W-1.5kW	CND	**R88A-CND01K-AP**
	[200VAC] 2.0kW [400VAC] 2.0kW	CND	**R88A-CND02K-AP**
Servomotor Encoder Connector		CN2	**R88A-CNW01R**
External Encoder Connector		CN4	**R88A-CNK41L**
Safety I/O Signal Connector		CN8	**R88A-CNK81S**

Servomotor Connectors

Description	Applicable Servomotor Capacity	Model
Servomotor Encoder Connector	[100 V/200 V] 3,000 r/min (50 to 750 W)	**R88A-CNK02R**
	[100 V/200 V] 3,000 r/min (1 to 5 kW), 2,000 r/min, 1,000 r/min [400 V] 3,000 r/min, 2,000 r/min, 1,000 r/min	**R88A-CNK04R**
Power Cable Connector	[100 V/200 V] 3,000 r/min (50 to 750 W)	**R88A-CNK11A**
	[200 V] [400V] 1,500 r/min (11 to 15kW)	**R88A-CNK21A-AP**
Brake Cable Connector	[100 V/200 V] 3,000 r/min (50 to 750 W)	**R88A-CNK11B**
	[200 V] [400V] 1,500 r/min (7.5 to 15kW) 1,000 r/min (6.0kW)	**R88A-CNK21B-AP**

Peripheral Devices (External Regeneration Resistors, Reactors, Mounting Brackets)

External Regeneration Resistors

Specifications	Model
80 W 50 Ω	**R88A-RR08050S**
80 W 100 Ω	**R88A-RR080100S**
220 W 47 Ω	**R88A-RR22047S1**
500 W 20 Ω	**R88A-RR50020S**

Reactors

Specifications EtherCAT Communications	Model
R88D-KNA5L-ECT/-KN01H-ECT(Single-phase)	**3G3AX-DL2002**
R88D-KN01L-ECT/-KN02H-ECT(Single-phase)	**3G3AX-DL2004**
R88D-KN02L-ECT/-KN04H-ECT(Single-phase)	**3G3AX-DL2007**
R88D-KN04L-ECT/-KN08H-ECT/-KN10H-ECT (Single-phase)	**3G3AX-DL2015**
R88D-KN15H-ECT (Single-phase)	**3G3AX-DL2022**
R88D-KN01H-ECT/-KN02H-ECT/-KN04H-ECT/ -KN08H-ECT/-KN10H-ECT/-KN15H-ECT (Three-phase)	**3G3AX-AL2025**
R88D-KN20H-ECT/-KN30H-ECT	**3G3AX-AL2055**
R88D-KN50H-ECT	**3G3AX-AL2110**
R88D-KN06F-ECT/-KN10F-ECT/-KN15F-ECT	**3G3AX-AL4025**
R88D-KN20F-ECT/-KN30F-ECT	**3G3AX-AL4055**
R88D-KN50F-ECT	**3G3AX-AL4110**
R88D-KT75H-ECT/-KT150F-ECT	**3G3AX-AL4220**

Mounting Brackets (L Brackets for Rack Mounting)

Specifications EtherCAT Communications	Model
R88D-KNA5L-ECT/-KN01L-ECT/-KN01H-ECT/ -KN02H-ECT	**R88A-TK01K**
R88D-KN02L-ECT/-KN04H-ECT	**R88A-TK02K**
R88D-KN04L-ECT/-KN08H-ECT	**R88A-TK03K**
R88D-KN10H-ECT/-KN15H-ECT/-KN06F-ECT/ -KN10F-ECT/-KN15F-ECT	**R88A-TK04K**

Interpreting Model Numbers

3G3MX2-A□□□□

1 2

3G3MX2

1) Voltage class

B	1-phase 200 VAC (200-V class)
2	3-phase 200 VAC (200-V class)
4	3-phase 400 VAC (400-V class)

2) Max. applicable motor capacity (CT)

001	0.1 kW
002	0.2 kW
004	0.4 kW
007	0.75 kW
015	1.5 kW
022	2.2 kW
030	3.0 kW
037	3.7 kW
040	4.0 kW
055	5.5 kW
075	7.5 kW
110	11 kW
150	15 kW

Ordering Information

3G3MX2 Inverter Models

Rated voltage	Enclosure ratings	Max. applicable motor capacity		Model
		CT: Heavy load	VT: Light load	
3-phase 200 VAC	IP20	0.1kW	0.2 kW	**3G3MX2-A2001**
		0.2 kW	0.4 kW	**3G3MX2-A2002**
		0.4 kW	0.75 kW	**3G3MX2-A2004**
		0.75 kW	1.1 kW	**3G3MX2-A2007**
		1.5 kW	2.2 kW	**3G3MX2-A2015**
		2.2 kW	3.0 kW	**3G3MX2-A2022**
		3.7 kW	5.5 kW	**3G3MX2-A2037**
		5.5 kW	7.5 kW	**3G3MX2-A2055**
		7.5 kW	11 kW	**3G3MX2-A2075**
		11 kW	15 kW	**3G3MX2-A2110**
		15 kW	18.5 kW	**3G3MX2-A2150**
3-phase 400 VAC	IP20	0.4 kW	0.75 kW	**3G3MX2-A4004**
		0.75 kW	1.5 kW	**3G3MX2-A4007**
		1.5 kW	2.2 kW	**3G3MX2-A4015**
		2.2 kW	3.0 kW	**3G3MX2-A4022**
		3.0 kW	4.0 kW	**3G3MX2-A4030**
		4.0 kW	5.5 kW	**3G3MX2-A4040**
		5.5 kW	7.5 kW	**3G3MX2-A4055**
		7.5 kW	11 kW	**3G3MX2-A4075**
		11 kW	15 kW	**3G3MX2-A4110**
		15 kW	18.5 kW	**3G3MX2-A4150**
1-phase 200 VAC	IP20	0.1 kW	0.2 kW	**3G3MX2-AB001**
		0.2 kW	0.4 kW	**3G3MX2-AB002**
		0.4 kW	0.55 kW	**3G3MX2-AB004**
		0.75 kW	1.1 kW	**3G3MX2-AB007**
		1.5 kW	2.2 kW	**3G3MX2-AB015**
		2.2 kW	3.0 kW	**3G3MX2-AB022**

EtherCAT Communication Unit

Name	Model
EtherCAT Communication Unit	**3G3AX-MX2-ECT**

3G3MX2 Related Options

Type	Specifications								Model
	% ED	Voltage	Max. Motor kW	Inverter 3G3MX2-A□		Connectable min. resistance Ω	Resist Ω	Braking torque %	
				3-Phase	1-Phase				
BRAKING RESISTORS	3% 10 sec max.	200V (Single-/ Three-phase)	0.12	2001	B001	100	400	200	AX-REM00K1400-IE
			0.25	2002	B002			180	
			0.55	2004	B004		200	180	AX-REM00K1200-IE
			1.1	2007	B007	50		100	
			1.5	2015	B015		70	140	AX-REM00K2070-IE
			2.2	2022	B022	35		90	
			4.0	2037	-		75	50	AX-REM00K4075-IE
			5.5	2055	-	20	35	75	AX-REM00K4035-IE
			7.5	2075	-	17		55	
			11	2110	-		35	40	AX-REM00K6035-IE
			15	2150	-	10	17	55	AX-REM00K9017-IE
		400V (Three-phase)	0.55	4004	-	180	400	200	AX-REM00K1400-IE
			1.1	4007	-			200	
			1.5	4015	-		200	190	AX-REM00K1200-IE
			2.2	4022	-	100	200	130	AX-REM00K2200-IE
			3.0	4030	-		120	160	AX-REM00K2120-IE
			4.0	4040	-			120	
			5.5	4055	-	70	75	140	AX-REM00K4075-IE
			7.5	4075	-			100	
			11	4110	-		100	50	AX-REM00K6100-IE
			15	4150	-	30	70	55	AX-REM00K9070-IE
	10% 10 sec max.	200V (Single-/ Three-phase)	0.12	2001	B001	100	400	200	AX-REM00K1400-IE
			0.25	2002	B002			180	
			0.55	2004	B004		200	180	AX-REM00K1200-IE
			1.1	2007	B007	50	70	200	AX-REM00K2070-IE
			1.5	2015	B015		75	130	AX-REM00K4075-IE
			2.2	2022	B022	35	35	180	AX-REM00K4035-IE
			4.0	2037	-		35	100	AX-REM00K6035-IE
			5.5	2055	-	20	20	150	AX-REM00K9020-IE
			7.5	2075	-	17	17	110	AX-REM01K9017-IE
			11	2110	-		17	75	AX-REM02K1017-IE
			15	2150	-	10	10	95	AX-REM03K5010-IE
		400V (Three-phase)	0.55	4004	-	180	400	200	AX-REM00K1400-IE
			1.1	4007	-			200	
			1.5	4015	-		200	190	AX-REM00K2200-IE
			2.2	4022	-	100	120	200	AX-REM00K5120-IE
			3.0	4030	-			160	
			4.0	4040	-		100	140	AX-REM00K6100-IE
			5.5	4055	-	70	70	150	AX-REM00K9070-IE
			7.5	4075	-		70	110	AX-REM01K9070-IE
			11	4110	-		70	75	AX-REM02K1070-IE
			15	4150	-	30	35	110	AX-REM03K5035-IE

Type	Specifications				Model
	Type	Voltage	Inverter 3G3MX2-A□	Rated Current (A)	
EMC LINE FILTERS	Foot Mounting [Rasmi]	200V (Single-phase)	B001 / B002 / B004	10	**AX-FIM1010-RE**
			B007	14	**AX-FIM1014-RE**
			B015 / B022	24	**AX-FIM1024-RE**
		200V (Three-phase)	2001 / 2002 / 2004 / 2007	10	**AX-FIM2010-RE**
			2015 / 2022	20	**AX-FIM2020-RE**
			2037	30	**AX-FIM2030-RE**
			2055 / 2075	60	**AX-FIM2060-RE**
			2110	80	**AX-FIM2080-RE**
			2150	100	**AX-FIM2100-RE**
		400V (Three-phase)	4004 / 4007	5	**AX-FIM3005-RE**
			4015 / 4022 / 4030	10	**AX-FIM3010-RE**
			4040	14	**AX-FIM3014-RE**
			4055 / 4075	23	**AX-FIM3030-RE**
			4110 / 4150	50	**AX-FIM3050-RE**
	Separate Mounting [Schaffner]	200V (Single-phase)	B001 / B002 / B004	10	**AX-FIM1010-SE**
			B007 / B015 / B022	24	**AX-FIM1024-SE**
		200V (Three-phase)	2001 / 2002 / 2004 / 2007	10	**AX-FIM2010-SE**
			2015 / 2022	20	**AX-FIM2020-SE**
			2037	30	**AX-FIM2030-SE**
			2055 / 2075	60	**AX-FIM2060-SE**
			2110	80	**AX-FIM2080-SE**
			2150	100	**AX-FIM2100-SE**
		400V (Three-phase)	4004 / 4007	5	**AX-FIM3005-SE**
			4015 / 4022 / 4030	10	**AX-FIM3010-SE**
			4040	14	**AX-FIM3014-SE**
			4055 / 4075	23	**AX-FIM3030-SE**
			4110 / 4150	50	**AX-FIM3050-SE**

Type	Specifications		Model
	Voltage	Inverter 3G3MX2-A□	
INPUT AC REACTORS	200V (Single-phase)	B001 / B002 / B004 / B007 / B015 / B022	**UNDER DEVELOPMENT**
	200V (Three-phase)	2001 / 2002 / 2004 / 2007	**AX-RAI02800080-DE**
		2015 / 2022 / 2037	**AX-RAI00880200-DE**
		2055 / 2075	**AX-RAI00350335-DE**
		2110 / 2015	**AX-RAI00180670-DE**
	400V (Three-phase)	4004 / 4007 / 4015	**AX-RAI07700050-DE**
		4022 / 4030 / 4040	**AX-RAI03500100-DE**
		4055 / 4075	**AX-RAI01300170-DE**
		4110 / 4150	**AX-RAI00740335-DE**

Type	Specifications		Model
	Voltage	Inverter 3G3MX2-A□	
DC REACTORS	200V (Single-phase)	B001 / B002	AX-RC10700032-DE
		B004	AX-RC06750061-DE
		B007	AX-RC03510093-DE
		B015	AX-RC02510138-DE
		B022	AX-RC01600223-DE
	200V (Three-phase)	2001 / 2002	AX-RC21400016-DE
		2004	AX-RC10700032-DE
		2007	AX-RC06750061-DE
		2015	AX-RC03510093-DE
		2022	AX-RC02510138-DE
		2037	AX-RC01600223-DE
		2055	AX-RC01110309-DE
		2075	AX-RC00840437-DE
		2110	AX-RC00590614-DE
		2150	AX-RC00440859-DE
	400V (Three-phase)	4004	AX-RC43000020-DE
		4007	AX-RC27000030-DE
		4015	AX-RC14000047-DE
		4022	AX-RC10100069-DE
		4030	AX-RC08250093-DE
		4040	AX-RC06400116-DE
		4055	AX-RC04410167-DE
		4075	AX-RC03350219-DE
		4110	AX-RC02330307-DE
		4150	AX-RC01750430-DE
OUTPUT AC REACTORS	200V (Single-phase)	B001 / B002 / B004	AX-RAO11500026-DE
		B007	AX-RAO07600042-DE
		B015	AX-RAO04100075-DE
		B022	AX-RAO03000105-DE
	200V (Three-phase)	2001 / 2002 / 2004	AX-RAO11500026-DE
		2007	AX-RAO07600042-DE
		2015	AX-RAO04100075-DE
		2022	AX-RAO03000105-DE
		2037	AX-RAO01830160-DE
		2055	AX-RAO01150220-DE
		2075	AX-RAO00950320-DE
		2110	AX-RAO00630430-DE
		2150	AX-RAO00490640-DE
	400V (Three-phase)	4004 / 4007 / 4015	AX-RAO16300038-DE
		4022	AX-RAO11800053-DE
		4030 / 4040	AX-RAO07300080-DE
		4055	AX-RAO04600110-DE
		4075	AX-RAO03600160-DE
		4110	AX-RAO02500220-DE
		4150	AX-RAO02000320-DE

Type	Specifications		Model
	Description	Diameter	
RADIO NOISE FILTERS	For 2.2 kW motors or below	21	**AX-FER2102-RE**
	For 15 kW motors or below	25	**AX-FER2515-RE**
	For 45 kW motors or below	55	**AX-FER5045-RE**

Type	Description	Model
PC CABLE	PC Communication cable (2m, PC USB to Mini USB Connecting Cable with Ferrite)	**AX-CUSBM002-E**
REMOTE OPERATOR	LCD Remote operator (5 Line LCD remote operator with copy function, cable length max. 3m.)	**AX-OP05-E**
	LED Remote operator with frequency reference volume	**3G3AX-OP01**
	3 meters cable for connecting remote operator	**3G3AX-CAJOP300-EE**
	Mounting Kit for LED Operator	**4X-KITMINI**

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Ordering Information

Sensors

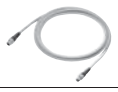
Appearance	Type			Model
	Color	NPN	EtherCAT communication function provided	FQ-MS120-ECT
		PNP		FQ-MS125-ECT
	Monochrome	NPN		FQ-MS120-M-ECT
		PNP		FQ-MS125-M-ECT

Touch Finder

Appearance	Type	Model
	DC power supply	FQ-MD30
	AC/DC/battery *	FQ-MD31

* AC Adapter and Battery are sold separately.

Bend resistant Cables for FQ-M Series

Appearance	Type			Model
	For EtherCAT and Ethernet cable Angle: M12/ Straight: RJ45		Cable length: 5 m	FQ-MWNL005
			Cable length: 10 m	FQ-MWNL010
	For EtherCAT and Ethernet cable Straight type (M12/RJ45)		Cable length: 5m	FQ-WN005
			Cable length: 10 m	FQ-WN010
	For EtherCAT cable Angle type (M12/M12)		Cable length: 5 m	FQ-MWNEL005
			Cable length: 10 m	FQ-MWNEL010
	For EtherCAT cable Straight type (M12/M12)		Cable length: 5m	FQ-MWNE005
			Cable length: 10 m	FQ-MWNE010
	I/O Cables	Angle type	Cable length: 5 m	FQ-MWDL005
			Cable length: 10 m	FQ-MWDL010
		Straight type	Cable length: 5 m	FQ-MWD005
			Cable length: 10 m	FQ-MWD010

Accessories

Appearance	Type		Model
	For Touch Finder	Panel Mounting Adapter	FQ-XPM
		AC Adapter (for models for DC/AC/Battery)	FQ-AC□ *
		Battery (for models for DC/AC/Battery)	FQ-BAT1
		Touch Pen (enclosed with Touch Finder)	FQ-XT
		Strap	FQ-XH
		SD Card (2 GB)	HMC-SD291

* AC Adapters for Touch Finder with DC/AC/Battery Power Supply. Select the model for the country in which the Touch Finder will be used.

Plug type	Voltage	Certified standards	Model
A	125 V max.	PSE	**FQ-AC1**
		UL/CSA	**FQ-AC2**
	250 V max.	CCC mark	**FQ-AC3**
C	250 V max.	---	**FQ-AC4**
BF	250 V max.	---	**FQ-AC5**
O	250 V max.	---	**FQ-AC6**

Cameras peripheral devices

Type		Model
Cameras peripheral devices	CCTV Lenses	**3Z4S-LE Series**
External Lightings		**FL Series**
Lighting Controllers	For FL Series	**FL-TCC1**

Interpreting Model Numbers

GX-□□ □□ □ □ □
1 2 3 4 5

1) Type

Code	Specifications
ID	DC Input
OD	DC Output
MD	DC Input/Output
OC	Relay Output
AD	Analog Input
DA	Analog Output
EC	Encoder Input

2) Number of I/O point

Code	Specifications
02	2 points (2CH)
04	4 points (4CH)
16	16 points
32	32 points

3) Input/Output type

Code	Digital Input/ Digital Output type	Analog Input/ Analog Output type	Encoder Input Type
1	NPN/Sinking	–	Open collector input, NPN
2	PNP/Sourcing	–	–
4	–	–	Line driver input, PNP
7	–	Multi 1 (Current/Voltage)	–

4) Connecting

Code	Specifications
1	Screw (Common) (2-tier Terminal Block)
2	Screw (Divided common) (3-tier Terminal Block)
8	e-CON

5) Figure/Function

Code	Digital Input/ Digital Output type	Analog Input/ Analog Output type	Encoder Input Type
None	Horizontal type	Standard type	–

Ordering Information

Digital I/O Terminal

Terminal Block Type

Name	Specifications			Model	Standards
2-tier terminal blocks	Inputs	16 inputs	NPN	GX-ID1611	UC1, N, L, CE
			PNP	GX-ID1621	
	Outputs	16 outputs	NPN	GX-OD1611	
			PNP	GX-OD1621	
	Outputs	16 outputs	Relay	GX-OC1601	
	Inputs/Outputs	8 inputs/8 outputs	NPN	GX-MD1611	
			PNP	GX-MD1621	
3-tier terminal blocks	Inputs	16 inputs	NPN	GX-ID1612	
			PNP	GX-ID1622	
	Outputs	16 outputs	NPN	GX-OD1612	
			PNP	GX-OD1622	
	Inputs/Outputs	8 inputs/8 outputs	NPN	GX-MD1612	
			PNP	GX-MD1622	

e-CON Connector Type

Name	Specifications			Model	Standards
e-CON Connector Type	Inputs	16 inputs	NPN	GX-ID1618	UC1, N, L, CE
			PNP	GX-ID1628	
	Outputs	16 outputs	NPN	GX-OD1618	
			PNP	GX-OD1628	
	Inputs/Outputs	8 inputs/8 outputs	NPN	GX-MD1618	
			PNP	GX-MD1628	
	Inputs	32 inputs	NPN	GX-ID3218	
			PNP	GX-ID3228	
	Outputs	32 outputs	NPN	GX-OD3218	
			PNP	GX-OD3228	
	Inputs/Outputs	16 inputs/16 outputs	NPN	GX-MD3218	
			PNP	GX-MD3228	

Analog I/O Terminal

2-tier Terminal Block Type

Name	Specifications		Model	Standards
2-tier terminal block type	Analog inputs	4 inputs	**GX-AD0471**	UC1, N, L, CE
	Analog outputs	2 outputs	**GX-DA0271**	

Encoder Input Terminal

3-tier Terminal Block Type

Name	Specifications		Model	Standards
3-tier Terminal Block Type	Open collector inputs	2 inputs	**GX-EC0211**	UC1, N, L, CE
	Line driver inputs	2 inputs	**GX-EC0241**	

Expansion Units

Name	Specifications				Model	Standards
Expansion Units	Inputs	8 inputs	NPN	One Expansion Unit can be mounted to one GX-ID16□1/OD16□1/OC1601 Digital I/O Terminal.	**XWT-ID08**	UC1, N, CE
			PNP		**XWT-ID08-1**	
	Outputs	8 outputs	NPN		**XWT-OD08**	
			PNP		**XWT-OD08-1**	
	Inputs	16 inputs	NPN		**XWT-ID16**	
			PNP		**XWT-ID16-1**	
	Outputs	16 outputs	NPN		**XWT-OD16**	
			PNP		**XWT-OD16-1**	

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

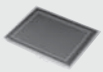
Ordering Information

Programmable Terminals

Product name	Specifications				Model	Standards
	Effective display area	Number of dots	Ethernet	Case color		
NS5-V2	5.7-inch STN monochrome	320 × 240 dots	Yes	Ivory	NS5-MQ11-V2	UC1, CE, N, L, UL Type4
				Black	NS5-MQ11B-V2	
	5.7-inch TFT color LED backlight		Yes	Ivory	NS5-SQ11-V2	
				Black	NS5-SQ11B-V2	
	5.7-inch High-luminance TFT color * LED backlight		Yes	Ivory	NS5-TQ11-V2	
				Black	NS5-TQ11B-V2	
NS8-V2	8.4-inch TFT	640 × 480 dots	Yes	Ivory	NS8-TV01-V2	UC1, CE, N, L
				Black	NS8-TV01B-V2	
NS10-V2	10.4-inch TFT	640 × 480 dots	Yes	Ivory	NS10-TV01-V2	UC1, CE, N, L, UL Type4
				Black	NS10-TV01B-V2	
NS12-V2	12.1-inch TFT	800 × 600 dots	Yes	Ivory	NS12-TS01-V2	
				Black	NS12-TS01B-V2	
NS15-V2	15-inch TFT	1,024 × 768 dots,	Yes	Silver	NS15-TX01S-V2	
				Black	NS15-TX01B-V2	

Note: To connect the NJ-Series Controller, NS system version 8.5 or higher is required. CX-Designer version 3.3 or higher is also required.
* NS5-TQ-Series (high luminance TFT) luminance is better than that of NS5-SQ-Series by about 110cd/m^2.

Options

Product name	Specifications		Model	Standards
Cable *1	USB relay cable Length: 1 m		NS-USBEXT-1M	---
Video Input Unit	Inputs: 4 channels Signal type: NTSC/PAL		NS-CA001	UC1, CE
	Input channels: 2 video channels and 1 RGB channel *2 Signal type: NTSC/PAL		NS-CA002	
Special Cable for the Console	Cable length: 2 m		F150-VKP (2 m)	---
	Cable length: 5 m		F150-VKP (5 m)	
Sheet/Cover *3 	Anti-reflection Sheets (5 surface sheets)	NS15	NS15-KBA04	
		NS12/10	NS12-KBA04	
		NS8	NS7-KBA04	
		NS5	NT30-KBA04	
	Protective Covers (5 pack) (anti-reflection coating)	NS12/10	NS12-KBA05	
		NS8	NS7-KBA05	
		NS5	NT31C-KBA05	
	Protective Covers (1 cover included) (Transparent)	NS15	NS15-KBA05N	
	Protective Covers (5 covers included) (Transparent)	NS12/10	NS12-KBA05N	
		NS8	NS7-KBA05N	
		NS5	NT31C-KBA05N	
Attachment	NT625C/631/631C-Series to NS12/10-Series		NS12-ATT01	
	NT625C/631/631C-Series to NS12/NS10-Series (Black)		NS12-ATT01B	
	NT610C-Series to NS12/10-Series		NS12-ATT02	
	NT620S/620C/600S-Series to NS8-Series		NS8-ATT01	
	NT600M/600G/610G/612G-Series to NS8-Series		NS8-ATT02	
Memory Card	128MB		HMC-EF183	
	256 MB		HMC-EF283	
	512 MB		HMC-EF583	
Memory Card Adapter	---		HMC-AP001	CE
Replacement Battery	Battery life: 5 years (at 25°C)		CJ1W-BAT01	---

*1 To connect the NS-Series PT to NJ-Series Controller, using a commercially available 10/100-BASE-TX twisted-pair cable. For detail, refer to the NS series SETUP MANUAL (Cat. No.V083).
Use a standard USB Type A male to Type B type male Cable to connect the NS-Series PT to a personal computer (CX-Designer).
Use a standard USB cable to connect the NS-Series PT to a PictBridge-compatible printer. USB cable type depends on the printer.
*2 One screen cannot display two video inputs simultaneously.
*3 A Chemical-resistant Cover (NT30-KBA01) is available only for the NS5.

Ordering Information

Communication Units

Function	Specification		Model code
EtherCAT interface unit	For up to 64 I/O units (slave to Sysmac controller)	84x58x70	GRT1-ECT
End plate	One unit required per bus interface	84x20x58	GRT1-END
End plate with memory function	Supports toolless replacement of PROFINET-IO interface unit	84x20x58	GRT1-END-M

I/O units

Function	Specification		Model code
4 NPN inputs	24 VDC, 6 mA, 3-wire connection	84x15x74	GRT1-ID4
4 PNP inputs	24 VDC, 6 mA, 3-wire connection	84x15x74	GRT1-ID4-1
8 NPN inputs	24 VDC, 4 mA, 1-wire connection + 4xG	84x15x74	GRT1-ID8
8 PNP inputs	24 VDC, 4 mA, 1-wire connection + 4xV	84x15x74	GRT1-ID8-1
4 AC inputs	110 VAC, 2-wire connection	84x15x74	GRT1-IA4-1
4 AC inputs	230 VAC, 2-wire connection	84x15x74	GRT1-IA4-2
4 NPN outputs	24 VDC, 500 mA, 2-wire connection	84x15x74	GRT1-OD4
4 PNP outputs	24 VDC, 500 mA, 2-wire connection	84x15x74	GRT1-OD4-1
4 PNP outputs with short-circuit protection	24 VDC, 500 mA, 3-wire connection	84x15x74	GRT1-OD4G-1
4 PNP outputs with short-circuit protection	24 VDC, 2 A, 2-wire connection	84x15x74	GRT1-OD4G-3
8 NPN outputs	24 VDC, 500 mA, 1-wire connection + 4xV	84x15x74	GRT1-OD8
8 PNP outputs	24 VDC, 500 mA, 1-wire connection + 4xG	84x15x74	GRT1-OD8-1
8 PNP outputs with short-circuit protection	24 VDC, 500 mA, 1-wire connection + 4xG	84x15x74	GRT1-OD8G-1
2 relay outputs	240 VAC, 2A, normally-open contacts	84x15x74	GRT1-ROS2
2 analog inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 0-20 mA, 4-20 mA	84x15x74	GRT1-AD2
2 analog outputs, voltage	±10 V, 0-10 V, 0-5 V, 1-5 V	84x15x74	GRT1-DA2V
2 analog outputs, current	0-20 mA, 4-20 mA	84x15x74	GRT1-DA2C
2 Pt100 inputs	Pt100, 2-wire or 3-wire connection	84x15x74	GRT1-TS2P
2 Pt1000 inputs	Pt1000, 2-wire or 3-wire connection	84x15x74	GRT1-TS2PK
2 Thermocouple inputs	Types B, E, J, K, N, R, S, T, U, W, PL2, with cold junction compensation	84x15x74	GRT1-TS2T

Other units

Function		Model code
I/O power feed unit, separates power supply between groups of I/O units	84x15x74	GRT1-PD2
I/O power feed unit with electronic overload protection, separates power supply between groups of I/O units	84x15x74	GRT1-PD2G
I/O power feed and distribution unit, separates power supply between groups of I/O units, 8xV + 4xG	84x15x74	GRT1-PD8
I/O power feed and distribution unit, separates power supply between groups of I/O units, 4xV + 8xG	84x15x74	GRT1-PD8-1
I/O power connection unit, 8xV + 4xG	84x15x74	GRT1-PC8
I/O power connection unit, 4xV + 8xG	84x15x74	GRT1-PC8-1
Turnback Unit, right-hand side	84x20x58	GRT1-TBR
Turnback Unit, left-hand side	84x58x70	GRT1-TBL
Turnback cable, one meter	1 m	GCN2-100

Accessories

Function	Model code
Replacement front connectors, pack of 5 pcs.	GRT1-BT1-5

Related Manuals

NJ-Series

Cat. No.	Model number	Manual
W500	NJ501-□□□□	NJ-series CPU Unit Hardware User's Manual
W501	NJ501-□□□□	NJ-series CPU Unit Software User's Manual
W507	NJ501-□□□□	NJ-series CPU Unit Motion Control User's Manual
W502	NJ501-□□□□	NJ-series Instructions Reference Manual
W508	NJ501-□□□□	NJ-series Motion Control Instructions Reference Manual
W505	NJ501-□□□□	NJ-series CPU Unit Built-in EtherCAT Port User's Manual
W506	NJ501-□□□□	NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual
W503	NJ501-□□□□	NJ-series Troubleshooting Manual
W490	CJ1W-AD0□□-□□/-DA0□□□/-MAD42	CJ-series Analog I/O Units Operation Manual for NJ-series CPU Unit
W498	CJ1W-PDC15/-AD04U/-PH41U	CJ-series Analog I/O Units Operation Manual for NJ-series CPU Unit
W491	CJ1W-TC003/-TC004/-TC103/-TC104	CJ-series Temperature Control Units Operation Manual for NJ-series CPU Unit
Z317	CJ1W-V680C11/-V680C12	CJ-series ID Sensor Units Operation Manual for NJ-series CPU Unit
W492	CJ1W-CT021	CJ-series High-speed Counter Units Operation Manual for NJ-series CPU Unit
W494	CJ1W-SCU□	CJ-series Serial Communication Units Operation Manual for NJ-series CPU Unit
W497	CJ1W-DRM21	CJ-series DeviceNet Units Operation Manual for NJ-series CPU Unit

Sysmac Studio

Cat. No.	Model number	Manual
W504	SYSMAC-SE2□□□	Sysmac Studio version 1 OPERATION MANUAL
V099	---	CX-Designer Ver.3.□ User's Manual
W464		CS/CJ/CP/NSJ Series CXIntegrator Ver.2.□ OPERATION MANUAL
W344		CX-Protocol OPERATION MANUAL

G5-Series

Cat. No.	Model number	Manual
I576	R88D-KN□-ECT/R88M-K	G5-SERIES EtherCAT Communications AC SERVOMOTOR AND SERVO DRIVE USER'S MANUAL

MX2-Series

Cat. No.	Model number	Manual
I570	3G3MX2	Multi-function Compact Inverter MX2-series USER'S MANUAL
I574	3G3AX-MX2-ECT	EtherCAT Communication Unit USER'S MANUAL
W453	CXONE-ALL□□C/D-V□ WS02-DRVC01	OPERATION MANUAL

FQ-M-Series

Cat. No.	Model number	Manual
Z314	FQ-MS□□□(-M) FQ-MS□□□(-M)-ECT	Specialized Vision Sensor for Positioning FQ-M-Series User's Manual

GX-Series

Cat. No.	Model number	Manual
W488	GX-□□□□□□□	GX-Series EtherCAT Slave USER'S MANUAL

NS-Series

Cat. No.	Model number	Manual
V083	NS15/NS12/NS10/NS8/NS5	NS Series Programmable Terminals SETUP MANUAL
V073	NS15/NS12/NS10/NS8/NS5	NS-Series Programmable Terminals PROGRAMMING MANUAL

GRT1-Series

Cat. No.	Model number	Manual
W455	GRT-□	GRT1 SmartSlice I/O Unit OPERATION MANUAL

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